



This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

- + *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
- + *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
- + *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
- + *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at <http://books.google.com/>



HOWARD ELLIOTT,
ROOM 603
GLOBE-DEMOCRAT BUILDING,

ST. LOUIS, MO.
PROPERTY OF

HOWARD ELLIOTT.

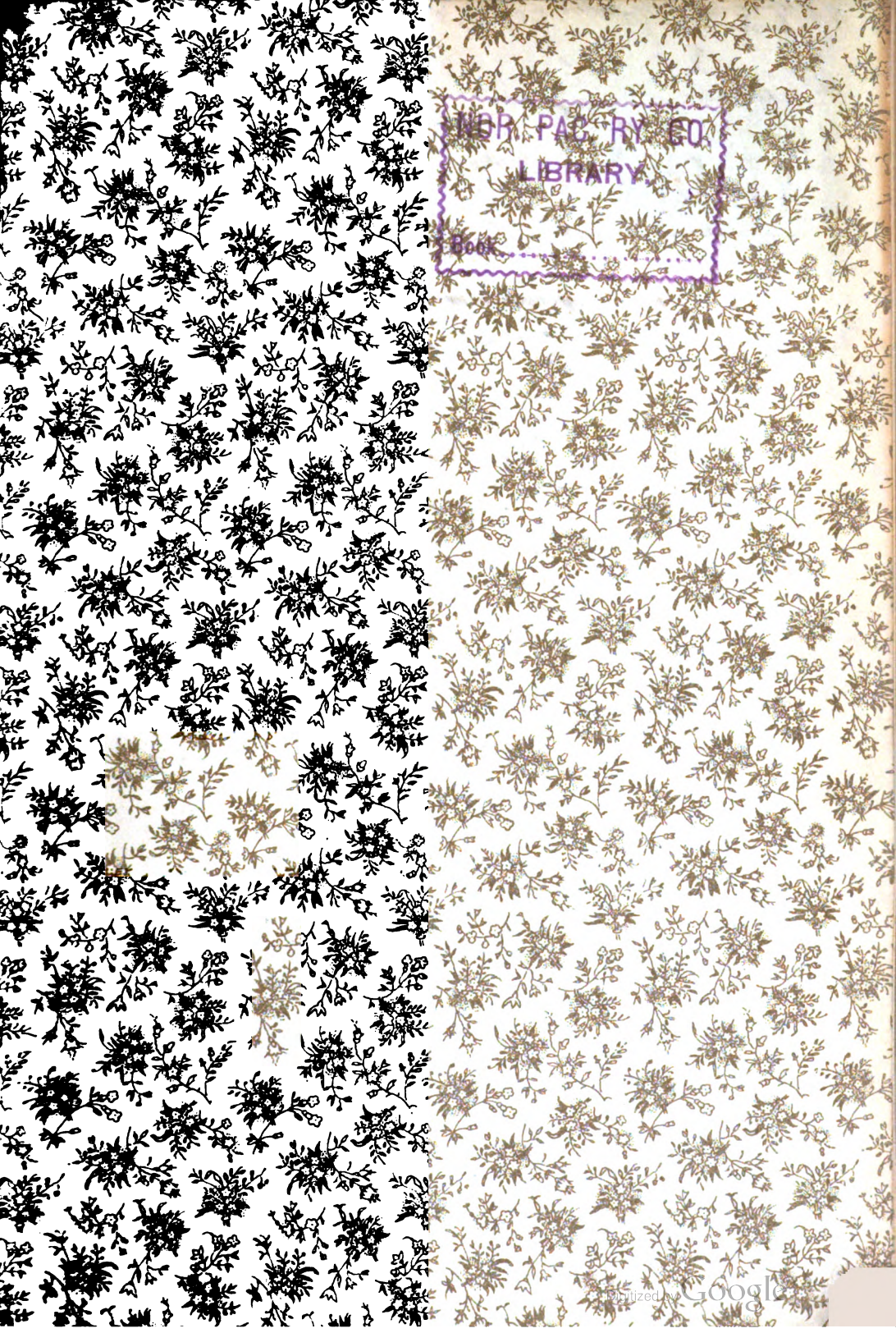
TRANSFERRED TO
CAROL SCIENCE LIBRARY

GRADUATE SCHOOL
OF BUSINESS
ADMINISTRATION
HARVARD BUSINESS
LIBRARY
GEORGE F. BAKER FOUNDATION



CANCELLED
FROM
BAKER LIBRARY

GODFREY LOWELL CABOT SCIENCE LIBRARY



HOB. PAC. RY. CO.
LIBRARY.

Book

REPORT OF THE PROCEEDINGS

OF THE

THIRTY-SECOND ANNUAL CONVENTION

OF THE

MASTER CAR BUILDERS' ASSOCIATION

HELD AT

SARATOGA, NEW YORK,

JUNE 15, 16 AND 17,

1898.

CHICAGO, ILL.:

PRINTED BY THE HENRY O. SHEPARD COMPANY,

212 AND 214 MONROE STREET.

1898.

July 30. 1925

RGBK
M423
1898

Gift from
Howard Elliott
LIST OF CONVENTIONS.

CANCELLED
FROM
BAKER LIBRARY

11011

Conventions have been held at the following places on the dates, and with presiding officers, as given.

A general convention preparatory to organization was held at Springfield, Mass., on May 15, 1867, when John Mulligan was Chairman.

MAR 11 1985

Convention.	President.	Date.	Place.
First	I. W. Van Houten.....	1867,	Altoona, Pa.
Second.....	I. W. Van Houten.....	1868,	Dayton, Ohio.
Third	I. W. Van Houten.....	1869,	Chicago, Ill.
Fourth	I. W. Van Houten.....	1870,	New York, N. Y.
Fifth	F. D. Adams	1871,	Richmond, Va.
Sixth	M. C. Andrews	1872,	St. Louis, Mo.
Seventh	M. C. Andrews	1873,	Boston, Mass.
Eighth	I. W. Van Houten.....	1874,	Cincinnati, Ohio.
Ninth	Leander Garey.....	1875,	New York, N. Y.
Tenth	Leander Garey.....	1876,	New York, N. Y.
Eleventh	Leander Garey.....	1877,	Cleveland, Ohio.
Twelfth	Leander Garey.....	1878,	Niagara Falls, N. Y.
Thirteenth	Leander Garey.....	1879,	Chicago, Ill.
Fourteenth	Leander Garey.....	1880,	Detroit, Mich.
Fifteenth	Leander Garey.....	1881,	New York, N. Y.
Sixteenth	Leander Garey.....	1882,	Philadelphia, Pa.
Adjourned, on Re- organization ... }	Leander Garey.....	1882,	Niagara Falls, N. Y.
Seventeenth	Leander Garey.....	1883,	Chicago, Ill.
Eighteenth	Leander Garey.....	1884,	Saratoga, N. Y.
Nineteenth	Leander Garey.....	1885,	Old Point Comfort, Va.
Twentieth	B. K. Verbryck	1886,	Niagara Falls, N. Y.
Twenty-first	B. K. Verbryck	1887,	Minneapolis, Minn.
Twenty-second	William McWood	1888,	Alexandria Bay, N. Y.
Twenty-third	William McWood	1889,	Saratoga, N. Y.
Twenty-fourth	William McWood	1890,	Old Point Comfort, Va.
Twenty-fifth	John Kirby	1891,	Cape May, N. J.
Twenty-sixth	John Kirby	1892,	Saratoga, N. Y.
Twenty-seventh	E. W. Grieves	1893,	Lakewood, N. Y.
Twenty-eighth	E. W. Grieves	1894,	Saratoga, N. Y.
Twenty-ninth	John S. Lentz	1895,	Alexandria Bay, N. Y.
Thirtieth	John S. Lentz	1896,	Saratoga, N. Y.
Thirty-first	S. A. Crone	1897,	Old Point Comfort, Va.
Thirty-second	S. A. Crone	1898,	Saratoga, N. Y.

OFFICERS FOR 1898-9.

PRESIDENT.

C. A. SCHROYER, Chicago & North-Western Railway, Chicago.

VICE-PRESIDENTS.

J. T. CHAMBERLAIN, Boston & Maine Railroad, Boston, Mass.

J. J. HENNESSEY, Chicago, Milwaukee & St. Paul Railway, Milwaukee, Wis.

W. J. ROBERTSON, Central Vermont Railroad, St. Albans, Vt.

TREASURER.

G. W. DEMAREST, Northern Central Railway, Baltimore, Md.

EXECUTIVE MEMBERS.

†W. S. MORRIS, Chesapeake & Ohio Railroad, Richmond, Va.

†SAMUEL HIGGINS, Lehigh Valley Railroad, Bethlehem, Pa.

†C. M. MENDENHALL, Philadelphia, Wilmington & Baltimore Railroad, Philadelphia, Pa.

*E. D. BRONNER, Michigan Central Railroad, Detroit, Mich.

*J. H. McCONNELL, Union Pacific System, Omaha, Neb.

*WM. APPS, Canadian Pacific Railway, Montreal, Canada.

SECRETARY.

JOHN W. CLOUD, 974 Rookery, Chicago, Ill.

†Term of office expires June, 1899.

*Term of office expires June, 1900.

STANDING COMMITTEES.

ON ARBITRATION.

G. W. RHODES, *Chairman.*

JOHN MACKENZIE,
M. M. MARTIN,

G. L. POTTER,
J. N. BARR.

ON SUPERVISION OF STANDARDS AND RECOMMENDED PRACTICE OF THE ASSOCIATION.

A. M. WAITT, *Chairman.*

G. L. POTTER,

WM. APPS.

ON TRIPLE VALVE TESTS.

G. W. RHODES, *Chairman.*

A. W. GIBBS,

W. S. MORRIS.

ON STANDARD WHEEL AND TRACK GAUGES.

To confer with American Railway Association.

J. N. BARR, *Chairman.*

G. W. RHODES,

C. M. MENDENHALL,

G. L. POTTER.

ON BRAKE SHOE TESTS.

S. P. BUSH, *Chairman.*

GEO. GIBBS,

R. P. C. SANDERSON.

ON PRICES IN MASTER CAR BUILDERS' RULES.

To report what changes may be desirable.

J. N. BARR, *Chairman.*

S. P. BUSH,

S. A. CHARPIOT,

J. H. McCONNELL,

T. B. PURVES, JR.

SUBJECTS AND COMMITTEES FOR 1899.

1.—*Trains Parting.*

G. N. DOW,
J. M. HOLT, D. HAWKSWORTH,
JNO. HODGE.

2.—*Square Bolt Heads and Nuts.*

B. HASKELL,
W. H. LEWIS, THOS. FILDES.

3.—*Should any additional compensation be paid for car repairs done west of the 105th meridian?*

J. N. BARR,
S. P. BUSH, J. H. McCONNELL,
L. C. HAYNES, T. B. KIRBY.

4.—*M. C. B. Couplers; to define contour lines more fully, when new and when worn, and propose specifications for couplers.*

W. W. ATTERBURY,
W. P. APPLEYARD, W. S. MORRIS.

5.—*Air Brake Appliances; to propose complete standards, including piping, with a view to reducing the joints to a minimum.*

A. L. HUMPHREY,
A. M. PARENT, H. C. McCARTY.

6.—*Ladders and Running Boards.*

A. E. MITCHELL,
P. H. PECK, S. HIGGINS.

7.—*Wheels and Axles; specifications for Wheels and Axles for 60,000, 80,000 and 100,000 pound cars.*

E. D. NELSON,

P. LEEDS,

WM. GARSTANG.

8.—*Uniformity of Section for Car Sills; to consider the practicability of adopting a standard.*

R. P. C. SANDERSON,

J. S. LENTZ,

N. FREY.

9.—*Heights of Couplers; to confer with the American Railway Association and with the Interstate Commerce Commission if necessary.*

SAML. HIGGINS, Chairman.

J. H. McCONNELL,

C. M. MENDENHALL.

10.—*Subjects.*

G. L. POTTER,

J. J. HENNESSEY,

R. P. C. SANDERSON.

LIST OF MEMBERS.

The names of Active members are printed in Roman type, Representative members in Italics and Associate members in Small Capitals.

DATE	NAME.	NO. OF CARS OWNED.	RAILROAD COMPANY AND ADDRESS.
1882	Adams, F. D. ....	.....	Boston & Albany, Newton, Mass.
1896	Adams, T. W.	3,824	<i>M. C. B., New England, Norwood, Mass.</i>
1892	Aldcorn, Thos. ....	.....	New Durham, N. J.
1898	Allen, A. J. ....	.....	G. F., South Side Elevated, Chicago, Ill.
1889	Anderson, Thos.	6,296	<i>M. C. B., Pittsburg & Western, Allegheny, Pa.</i>
1889	Anderson, Geo. T. ....	.....	Supt., C. N. Y. & B. Refr. Co., Elsdon, Ill.
1897	Angevine, F. ....	.....	F. C. D., Terre Haute & Indianapolis, St. Louis, Mo.
1897	Appleyard, W. P. ....	.....	M. C. B., N. Y. N. H. & H. R. R., New Haven, Conn.
1887	Apps, William	20,893	<i>M. C. B., Canadian Pacific, Montreal, Can.</i>
1896	Arp, W. C.	6,274	<i>S. M. P., Terre Haute & Indianapolis, Terre Haute, Ind.</i>
1894	Ashley, W. E. ....	.....	Supt., North Carolina Car Co., Raleigh, N. C.
1895	Atmur, W. J. ....	.....	Supt., Illinois Car & Equipment Co., Hegewisch, Ill.
1896	Atterbury, W. W.	54,319	<i>S. M. P. Penna. R. R., Altoona, Pa.</i>
1887	Augustus, Willis ..	989	<i>S. M., Keokuk & Western, Centreville, Iowa.</i>
1896	Austin, Stuart	232	<i>Mech. Supt., Lake Erie & Detroit River, Walkerville, Ont.</i>
1897	Bailey, W. E.	743	<i>Supt., Lehigh & Hudson River, Warwick, N. Y.</i>
1888	Baker, J. W. ....	.....	Del. Lackawanna & Western, Dover, N. J.
1897	Ball, H. F. ....	.....	G. C. I., Lake Shore & Michigan Southern, Cleveland, Ohio.
1895	Ballentine, D. W.	2,850	<i>M. C. B., Seaboard Air Line, Portsmouth, Va.</i>
1884	Barr, J. N.	29,434	<i>S. M. P., Chi. Milwaukee & St. Paul, Milwaukee, Wis.</i>
1883	Barber, J. C. ....	.....	St. Paul, Minn.
1892	Bartlett, H. ....	.....	S. M. P., Boston & Maine, Boston, Mass.
1895	Baty, J. A. ....	.....	F. C. I., N. Y. Cent. & Hudson River, Syracuse, N. Y.
1890	Bean, John.	2,389	<i>M. C. B., Cleveland, Canton & Southern, Canton, Ohio.</i>
1895	Benson, E. A. ....	.....	Mgr., Wagner Palace Car Works, Buffalo, N. Y.
1896	Bentley, W. F. ....	.....	G. C. I., Baltimore & Ohio, Baltimore, Md.
1893	Billingham, Jos. ....	.....	M. M., Baltimore & Ohio, Glenwood, Pittsburg, Pa.
1871	Blackall, R. C.	12,305	<i>Supt. Mch., Delaware & Hud. Canal Co., Albany, N. Y.</i>
1882	Blackwell, Charles. ....	.....	4400 St. Catharine St., Montreal, Can.
1880	Blackwell, K. W. ....	.....	Pres., Canada Switch & Spring Co., Canal and Conde Sts., Montreal, Can.
1887	Boatman, F. P. ....	.....	Stanberry, Mo.
1890	Bossinger, H. C. ....	.....	G. F., Chesapeake & Ohio, Huntington, W. Va.
1896	Bossinger, J. J.	2,213	<i>M. C. B., Florida Central & Peninsular, Ferdinand, Fla.</i>
1891	Bowen, H. A. ....	.....	Chicago, Ill.
1897	Bowles, H. G.	1,673	<i>G. S., Monongahela River, Monongah, W. Va.</i>
1897	Braden, J. B.	5,617	<i>S. M. P. & C., Wheeling & Lake Erie, Toledo, Ohio.</i>
1898	Braund, B. R.	54	<i>M. M., Leavenworth, Kansas & Western, Leavenworth, Kansas.</i>

LIST OF MEMBERS.— *Continued.*

DATE.	NAME.	NO. OF CARS OWNED.	RAILROAD COMPANY AND ADDRESS.
1873	Bray, F. O.		M. C. B., Lake Shore & Mich. Southern, Adrian, Mich.
1893	Brasier, F. W.	33,527	Asst. Supt. Machy., Illinois Central, Chicago, Ill.
1891	Brimson, W. G.		Prest., Chicago, Lake Shore & Eastern, Chicago, Ill.
1897	Brooke, George D.		M. C. B., St. Paul & Duluth, Gladstone, Minn.
1889	Bronner, E. D.	15,404	Asst. S. M. P., Michigan Central, Detroit, Mich.
1896	Brown, W. A.	858	M. M., Buffalo & Susquehanna, Galeton, Pa.
1891	Brück, H. T.	498	M. of M., Cumberland & Pennsylvania, Mt. Savage, Md.
1882	Bryan, H. S.	3,029	Master Mech., Duluth & Iron Range, Two Harbors, Minn.
1885	Buchanan, Wm.	45,769	Supt., M. P. & R. S., N. Y. Cent. & Hudson River, West Shore and Rome, Wat. & Ogdensburg, Grand Central Depot, New York City.
1892	Buker, Joseph.		Supt., Consolidated Cattle Car Co., Chicago, Ill.
1883	Bush, S. P.	12,280	Supt. M. P., P. C. C. & St. L., Columbus, Ohio.
1882	Bushnell, R. W.	4,930	M. C. B., Bur. Cedar Rapids & Nor., Cedar Rapids, Iowa.
1896	Butcher, G. W.		S. M. P. & M., San Antonio & Aransas Pass, San Antonio, Texas.
1886	Butler, C. J.	3,993	M. C. B., Fall Brook, Corning, N. Y.
1886	Cade, J. R.		M. C. B., Southern Pacific, Houston, Texas.
1894	Cameron, J. E.		G. F. C. D., Georgia & Alabama, Americus, Ga.
1893	Canda, F. E.		Canda Mfg. Co., 11 Pine St., N. Y.
1898	Capps, J. E.	1,234	Georgia Southern & Florida, Macon, Ga.
1890	Carlton, E. T.		Joliet, Ill.
1883	Carlton, Howard ..		South Baltimore Car Works, Baltimore, Md.
1889	Carr, W. K.		G. F., Norfolk & Western, Roanoke, Va.
1897	Carroll, C. H.	513	Pittsburgh & Eastern, Mahaffay, Pa.
1895	Carson, H. M.		Asst. Engr. M. P., Pennsylvania R. R., Altoona, Pa.
1890	Carson, M. T.	5,032	Supt. Machinery, Mobile & Ohio, Mobile, Ala.
1894	Casanave, F. D.		Gen. S. M. P., Pennsylvania, Altoona, Pa.
1896	Case, S. T.		M. C. B., N. Y. C. & H. R., New York City.
1887	Casey, J. J.		Supt., Haskell & Barker Car Co., Michigan City, Ind.
1895	Chaffee, F. W.		M. C. B., N. Y. Cent. & Hudson River, West Albany, N. Y.
1883	Chamberlain, J. T.	11,412	M. C. B., Boston & Maine, Boston, Mass.
1889	Charpiot, S. A.		Central of Georgia, Macon, Ga.
1896	Chase, F. A.	3,895	G. M. M., H. & St. J., St. L. K. & N. W., K. C. St. J. & C. B., and C. B. & K. C. R'ys, St. Joseph, Mo.
1893	Child, Alfred.	18,673	G. C. F., Northern Pacific, St. Paul, Minn.
1897	Chubb, T. L.		Loco. Car and Wagon Supt., Buenos Aires Western, Talleres, Tolosa, Buenos Aires, S. A.
1898	Clark, C. S.		G. F., H. C. Frick Coke Co., Scottsdale, Pa.
1890	Clark, Isaac W.		M. M., Cape Fear & Yadkin Valley, Fayetteville, N. C.
1895	Cleaver, F. C.		M. M., L. E. & St. L. Con., Princeton, Ind.
1893	Clifford, C. J.	3,086	S. M. P., Chicago, Lake Shore & Eastern, So. Chicago, Ill.
1895	Close, Henry.		M. E., Allison Mfg. Co., Philadelphia, Pa.

LIST OF MEMBERS — *Continued.*

DATE.	NAME.	NO. OF CARS OWNED.	RAILROAD COMPANY AND ADDRESS.
1886	Coghlan, John .....	.....	M. C. B., Boston, R. B. & Lynn, E. Boston, Mass.
1890	Coller, Chas.	5,999	M. C. B., Chicago, Indianapolis & Louisville, La Fayette, Ind.
1897	Collinson, Jas.	2,134	S. M., Gulf, Colo. & Santa Fe, Galveston, Tex.
1897	Connelly, M. J.	246	F. S. & E., Chattanooga, Rome & Southern, Rome, Ga.
1889	Connolly, J. J.	3,142	M. M., Dul. So. Shore & Atlantic, Marquette, Mich.
1887	Cook, John S.	1,205	M. M., Georgia and G. J. & S., Augusta, Ga.
1893	Cooke, W. I. ....	.....	Chicago & Eastern Illinois, Moline, Ind.
1897	Corinth, A. B. ....	.....	F. C. R., Southern, Knoxville, Tenn.
1887	Cormack, Wm.	7,811	M. C. B., Wisconsin Central, Stevens Point, Wis.
1888	Cory, Chas. H.	8,750	S. M. P., Cin., Hamilton & Dayton, Lima, Ohio.
1891	Coulter, H. ....	.....	G. C. I., Phila. Wil. & Balto., Philadelphia, Pa.
1897	Courson, J. F. ....	.....	G. F., Pennsylvania, Pitcairn, Pa.
1886	Cowan, Jno.	3,098	M. C. B., Allegheny Valley, Verona, Pa.
1887	Cox, Lewis J. ....	.....	Terre Haute Car & Mfg. Co., Terre Haute, Ind.
1891	Crone, S. A. ....	.....	Asst. Supt. M. P. & R. S., N. Y. C. & H. R., Grand Central Station, New York.
1898	CROSSMAN, W. D. ....	.....	EDITOR, RAILWAY MASTER MECHANIC, CHICAGO, ILL.
1891	Cullen, Jas.	5,790	S. M. P., Nashville, Chatt. & St. Louis, Nashville, Tenn.
1894	Cunningham, Jas.	1,345	M. M., Choctaw, Oklahoma & Gulf, Shawnee, I. T.
1889	Davenport, C. W. ....	.....	317 Superior St., Cleveland, Ohio.
1887	Davis, Jno. H. ....	.....	M. C. B., Wilmington & Weldon, Wilmington, N. C.
1895	Davis, Thos. ....	.....	Ferro Carril, Verapaz, Panzos, Guatemala, C. A.
1897	Dawson, E. ....	.....	Pittsburg, Kan.
1896	Deacon, Edw. ....	.....	Acting Supt., Consolidated Rolling Stock Co., Bridgeport, Conn.
1895	Deem, C. G.	303	G. C. F., Chicago Junction, U. S. Yards, Chicago, Ill.
1897	DeHaven, C. A.	110	M. M., Kansas Midland, Wichita, Kan.
1868	Demarest, G. W. ....	.....	M. C. B., Northern Central, Baltimore, Md.
1873	Denver, Jas. ....	.....	N. Y. N. H. & Hartford, New Haven, Conn.
1888	Dickerman, C. H. ....	.....	Milton Car Works, Milton, Pa.
1881	Divine, Jno. F. ....	.....	Genl. Supt., Wil. & Wel., Wil. Col. & Aug. and N. E. of S. C., Wilmington, N. C.
1897	Doerr, H. C. ....	.....	M. M., Eastern R'y of Minn., W. Superior, Wis.
1898	Dolan, S. M. ....	.....	F. C. D., Wiggins Ferry Co., East St. Louis, Ill.
1891	Donaldson, Morley.	2,800	Supt., Canada Atlantic, Ottawa, Can.
1882	Doran, J. E. ....	.....	F. C. R., Boston & Albany, E. Albany, N. Y.
1894	Dow, Frank. ....	.....	Supt., Pacific Transp. Co., Boston Live Stock Line, Chicago Furniture Co., Boston, Mass.
1892	Dow, Geo. N. ....	.....	M. C. B., Lake Shore & Mich. Southern, Cleveland, Ohio.
1891	Downing, T. ....	.....	Station E, Minneapolis, Minn.
1892	Doyle, John. ....	.....	M. C. B., Mo. Kan. & Tex., Denison, Tex.
1896	Duff, J. N. ....	.....	M. C. B., Burton Stock Car Co., Chicago, Ill.
1883	Duncan, T. G. ....	.....	Chillicothe, Ohio.
1897	Dunn, J. F.	4,546	S. M. P. & M., Oregon Short Line, Salt Lake City, Utah.
1894	Durborow, R. N. ....	.....	M. M., Penna. R. R., Philadelphia, Pa.

LIST OF MEMBERS — *Continued.*

DATE.	NAME.	NO. OF CARS OWNED.	RAILROAD COMPANY AND ADDRESS.
1896	Eaton, F. H. ....	.....	Prest., Jackson & Woodin Mfg. Co., Berwick, Pa.
1895	Eckhart, Jno., Jr. ....	.....	Erie, Bradford, Pa.
1894	Eddy, F. H. ....	.....	F. C. S., Fitchburg, Fitchburg, Mass.
1896	Elder, Jos.	520	<i>M. M., Rock Island & Peoria, Peoria, Ill.</i>
1893	Elliott, J. M., Jr. ....	.....	Prest., The Elliott Car Co., Gadsden, Ala.
1891	Emerson, R. H.	207	<i>M. C. B., Mason City & Ft. Dodge, Ft. Dodge, Iowa.</i>
1897	Emmert, W. B.	3	<i>Supt., Bristol, Elizabethtown & Nor. Car, Bristol, Tenn.</i>
1884	Ennis, W. C. ....	.....	North Paterson, N. J.
1896	Fay, A. R. ....	.....	G. A., Swift Live Stock Trans. Co., Chicago, Ill.
1897	Fergusson, H. A. ....	.....	A. M. M., Pennsylvania, Jersey City, N. J.
1893	Fildes, Thos. ....	.....	M. C. B., L. S. & M. S., Englewood, Ill.
1897	Fisher, E.	112	<i>G. S., Toronto, Hamilton & Buff., Hamilton, Ont., Can.</i>
1896	Fitzgerald, John. ....	.....	F. C. R., Erie, Deposit, N. Y.
1898	Fleming, J. W. ....	.....	G. F. C. D., Ches. & Ohio, Richmond, Va.
1894	Ford, C. H. ....	.....	G. F. C. D., Boston & Maine, Worcester, Mass.
1873	FORNEY, M. N. ....	.....	501 FIFTH AVE., NEW YORK CITY.
1882	Forsyth, Wm. ....	.....	Supt. M. P., Northern Pacific, St. Paul, Minn.
1897	Foster, Geo. F. ....	.....	Lexington, Ky.
1886	Foster, Wm. A. ....	.....	S. M. P. & M., Fall Brook, Corning, N. Y.
1896	Fowler, W. E.	3,144	<i>M. C. B., Union Pacific, Denver & Gulf, Denver, Colo.</i>
1895	Fox, Frank L. ....	.....	F. C. R., Detroit, Lansing & Northern, Ionia, Mich.
1898	Fox, P. ....	.....	F. C. R., Erie, Huntington, Ind.
1887	Fraser, Thomas A. ....	.....	Supt., Wells & French Co., Chicago, Ill.
1897	Frey, N.	3,350	<i>Chicago, Burlington & Northern, La Crosse, Wis.</i>
1897	Friese, N. L. ....	.....	G. F. C. W., Norfolk & Western, Roanoke, Va.
1890	Gage, C. M.	2,645	<i>G. M., Hunt & Broadtop, Huntingdon, Pa.</i>
1891	Galbraith, R. M.	5,140	<i>G. M. M., St. Louis, South-Western, Pine Bluff, Ark.</i>
1893	Garland, R. T. ....	.....	A. G. F., Pennsylvania, W. Philadelphia, Pa.
1890	Garrett, M. A. ....	.....	1434 Monadnock Building, Chicago, Ill.
1893	Garrick, J. R. ....	.....	Foreman, Texas & New Orleans, Beaumont, Tex.
1892	Garrison, P. E. ....	.....	M. M., Fonda, Johnstown & Gloversville, Gloversv'e, N. Y.
1888	Garstang, Wm.	17,488	<i>Supt. M. P., Clev., Cin., Chicago & St. Louis, Indianapolis, Ind.</i>
1891	Gibbs, A. W. ....	.....	Pennsylvania, Altoona, Pa.
1890	Gibbs, Geo. ....	.....	Baldwin Loco. Works, Philadelphia, Pa.
1894	Gibson, Orlando ....	.....	F. C. S., Pennsylvania, Huntingdon, Pa.
1894	Gilbert, E. B.	3,614	<i>M. M., Pittsburgh, Bessemer & Lake Erie, Greenville, Pa.</i>
1897	Givin, F. A.	266	<i>Buffalo, St. Mary's & S.-W., St. Mary's, Pa.</i>
1897	Glaser, J. ....	.....	M. M., Cleveland & Marietta, Cambridge, Ohio.
1891	Glover, J. B., Jr. ....	.....	Supt. M. P., Marietta & Nor. Ga., Marietta, Ga.
1897	Goehrs, W. H. ....	.....	M. S., Continental Fruit Express, Chicago, Ill.
1897	Gorrell, W. G. ....	.....	M. C. B., Phila. & Reading, Reading, Pa.
1873	Graham, Chas. ....	.....	M. M., Del. Lackawanna & Western, Kingston, Pa.
1895	Graham, J. F.	3,055	<i>M. M., Oregon R'y & Nav. Co., Albina, Ore.</i>
1889	Greatsinger, J. L. ....	.....	Prest. & G. M., Duluth & Iron Range, Duluth, Minn.
1898	Greene, M. D. ....	.....	Act'g Supt. National Car Co., St. Albans, Vt.
1885	Grieves, E. W. ....	.....	1756 Park Ave, Baltimore, Md.

LIST OF MEMBERS — *Continued.*

DATE.	NAME.	NO. OF CARS OWNED.	RAILROAD COMPANY AND ADDRESS.
1886	Griffith, Fred B.		M. M., Del., Lackawanna & Western, Buffalo, N. Y.
1889	Groves, J. R.	6,350	S. R. S., St. Louis & San Francisco, Springfield, Mo.
1892	Gunn, Robt.		F. C. R., Erie, Buffalo, N. Y.
1870	Hackett, Geo.		Philadelphia & Reading, Elizabeth, N. J.
1882	Hackney, Clem.		Mgr., Fox Solid Pressed Steel Co., Joliet, Ill.
1896	Hanglin, J. A.		M. M., Hot Springs, Malvern, Ark.
1894	Hannaford, P. W.		G. F. C. D., Maine Central, Waterville, Me.
1896	Harris, E. W.		M. C. B., Eureka & Palisade, Palisade, Nev.
1894	Harris, Wells.		Erie, Binghamton, N. Y.
1887	Harrison, W. H.		S. M. P., Baltimore & Ohio, Newark, Ohio.
1896	Harrity, A.	460	M. M., Butte, Anaconda & Pacific, Anaconda, Mont.
1893	Haskell, B.	5,412	S. M. P., Chicago & West Michigan; Detroit, Grand Rapids & Western, Grand Rapids, Mich.
1893	Hassman, Wm.		Illinois Central, Paducah, Ky.
1891	Hatswell, T. J.	3,316	M. M., Flint & Pere Marquette, Saginaw, E. S., Mich.
1898	Hatswell, T. J., Jr.		G. F., Flint & Pere Marquette, Saginaw, E. S., Mich.
1889	Hawthornth, D.	9,320	S. M. P., Bur. & Missouri River, Plattsmouth, Neb.
1891	Hayes, R. T.		F. C. R., Southern, Memphis, Tenn.
1897	Haynes, L. C.		G. A., Commerce Despatch Line, St. Louis, Mo.
1893	Hayward, H. S.	10,000	S. M. P., West Jersey & Seashore, Jersey City, N. J.
1883	Hecker, Frank J.		Mich. Pen. Car Co., Detroit, Mich.
1890	Hennessey, J. J.		M. C. B., Chicago, Milwaukee & St. Paul, West Milwaukee, Wis.
1897	Henney, John.	10,953	Supt. M. P., New York, New Haven & Hartford, New Haven, Conn.
1897	Herbert, R. L.	586	M. M., N. Y. T. & M. and G. W. T. & P., Victoria, Tex.
1897	Herr, E. M.		Westinghouse Air Brake Co., Pittsburgh, Pa.
1897	Hickey, Jno.	1,200	S. M. P., Rio Grande Western, Salt Lake City, Utah.
1892	Higgins, Sam'l.		S. M. P., Lehigh Valley, South Bethlehem, Pa.
1898	Hill, J. W.		M. M., Peoria & Pekin, Union, Peoria, Ill.
1893	Hinckley, A. C.	1,020	M. M., St. Joseph & Grand Island, St. Joseph, Mo.
1879	Hodge, John.		M. C. B., Atchison, Topeka & Santa Fe, Topeka, Kan.
1890	Hoffecker, W. L.		Asst. S. M. P. and R. S., Central of New Jersey, Elizabethport, N. J.
1890	Holt, J. M.		G. F. C. R., Southern Railway, Washington, D. C.
1894	Holt, David.	715	M. of M., Western Maryland, Union Bridge, Md.
1898	Horrigan, Jno.	2,000	Elgin, Joliet & Eastern, Joliet, Ill.
1889	Howard, C. H.		Safety Car Heat & Light Co., St. Louis, Mo.
1897	Hubbell, Ira C.	6,145	P. A., K. C. Pittsburgh & Gulf; Omaha, Kansas City & Eastern; Omaha & St. Louis, Kansas City, Mo.
1806	Hufsmith, F.	2,361	S. M. P. and R. S., International & Great Northern, Palestine, Tex.
1891	Humphrey, A. I.	1,572	S. M. P., Colorado Midland, Colorado Springs, Colo.
1884	Hunter, David W.		New England, Norwood, Mass.
1882	Jackson, Job H.		Prest., Jackson & Sharp Co., Wilmington, Del.
1897	Jackson, O. H.	100	M. M., S. F. P. & P., Prescott, Arizona.
1897	Jennings, Wm.	1,493	S. M. D., Mexican International, Ciudad Porfirio Diaz, Mex.

LIST OF MEMBERS.—Continued.

DATE.	NAME.	NO. OF CARS OWNED.	RAILROAD COMPANY AND ADDRESS.
1887	Johann, Jacob.....	.....	1003 South Seventh St., Springfield, Ill.
1882	Johnson, F.....	.....	Supt., Buffalo Car Mfg. Co., Buffalo, N. Y.
1894	Johnstone, F. W. ..	4,194	<i>S. M. P. and M., Mexican Central, City of Mexico, Mex.</i>
1895	Johnson, R. H....	770	<i>M. M., Atlanta & West Point and Western of Ala., Montgomery, Ala.</i>
1895	Joughins, G. R ...	.....	<i>S. M., Intercolonial, Moncton, N. B., Can.</i>
1894	Kearney, Alex.....	.....	Asst. E. M. P., Penna., Jersey City, N. J.
1894	Keegan, J. E.....	3,116	<i>M. M., Grand Rapids & Inatana, Grand Rapids, Mich.</i>
1894	Keiber, Geo.....	.....	Reading, Pa.
1883	Keith, Isaac.....	.....	Prest., Keith Mfg. Co., Sagamore, Mass.
1896	Kells, Willard.....	.....	M. M., Erie, Cleveland, Ohio.
1882	Kenison, Chas. H. ..	3,968	<i>M. C. B., Maine Central, Waterville, Me.</i>
1895	Kennerdell, Edw. ..	1,020	<i>G. F., Cleveland Terminal & Valley, Cleveland, Ohio.</i>
1896	Kenney, G. W. ...	850	<i>S. M. P., Rutland, Rutland, Vt.</i>
1894	Killen, W. E.....	3,900	<i>M. C. B., St. Louis, Chicago & St. Paul; Chicago, Peoria & St. Louis, Springfield, Ill., and Alton Terminal, Jerseyville, Ill.</i>
1898	King, Samuel.....	.....	M. C. B., Grand Trunk, London, Ont., Can.
1897	King, Sidney D ...	1,200	<i>Erie & Wyoming Valley, Dunmore, Pa.</i>
1883	Kirby, John.....	.....	Lake Shore & Michigan Southern, Adrian, Mich.
1892	Kirby, T. B.....	.....	Supt., Armour Refr. Line, Chicago, Ill.
1887	Kittredge, A. M. ....	.....	Barney & Smith Mfg. Co., Dayton, Ohio.
1897	Kline, Theo. D....	5,348	<i>G. S., Central of Ga., Savannah, Ga.</i>
1897	Knox, J. S.....	.....	T. M., Cudahy Refr. Line, So. Omaha, Neb.
1898	Lake, E. M.....	25	<i>M. M., Gulf & Ship Island, Gulfport, Miss.</i>
1895	La Lime, E.....	1,694	<i>M. M., Ohio River, Parkersburg, W. Va.</i>
1896	LANE, F. W.....	.....	MECH. EDITOR, RAILWAY AGE, CHICAGO.
1897	Lane, J. R.....	150	<i>G. M., Macon & Birmingham, Macon, Ga.</i>
1897	Lauer, F. G.....	.....	M. C. B., Buffalo, Rochester & Pittsburgh, Dubois Pa.
1895	Lavery, W.....	.....	Asst. S. M. P., Erie, Cleveland, Ohio.
1896	Lawes, T. A.....	9,548	<i>S. M. P. and M., Chicago & Eastern Illinois, Dan- ville, Ill.</i>
1889	Leeds, Pulaski	20,749	<i>S. M., Louisville & Nashville, Louisville, Ky.</i>
1879	Lentz, John S.....	39,068	<i>S. C. D., Lehigh Valley, Packerton, Pa.</i>
1867	Levan, J. P.....	.....	F. C. S., Pennsylvania, Altoona, Pa.
1889	Lewis, W. H.....	18,460	<i>S. M. P., Norfolk & Western, Roanoke, Va.</i>
1890	Lilley, Geo. W.....	.....	Mgr. Canda Cattle Car Co., Chicago, Ill.
1896	Lindstrom, Chas ..	.....	A. E. M. P., Penna. R. R. Co., Altoona, Pa.
1892	Lord, E. P.....	.....	Supt, H. K. Porter & Co., Pittsburg, Pa.
1894	Love, W. A.....	.....	Rome, Ga.
1896	Lowther, B. F.....	48	<i>Supt. East & West R. R., Cedartown, Ga.</i>
1897	Lucas, W. O.....	.....	Loco. Supt., Central Argentine, Rosario, Arg. Rep., S. A.
1891	Lungren, W. H....	.....	F. C. S., Phila., Wil. & Baltimore, Wilmington, Del.
1894	Lyons, Tracy.....	5,703	<i>M. M., Chicago Great Western, St. Paul, Minn.</i>
1891	McAlpine, A. R.....	.....	Western Car Co's Shops, Indianapolis, Ind.
1882	McCarthy, H. C.....	.....	G. C. I., Philadelphia & Erie, Williamsport Pa.

LIST OF MEMBERS—Continued.

DATE.	NAME.	NO. OF CARS OWNED.	RAILROAD COMPANY AND ADDRESS.
1891	McConnell, J. H.	13,953	<i>S. M. P. and M., Union Pacific, Omaha, Neb.</i>
1895	McCuen, J. P.	4,506	<i>S. M. P. and M., Cin., New Orleans & Texas Pacific, Ludlow, Ky.</i>
1897	McCuen, R. E.	378	<i>Lexington & Eastern Lexington, Ky.</i>
1897	McCullough, C. B.	43	<i>Mgr. Cammal & Black Forest, Cammal, Pa.</i>
1882	McGee, James.	3,075	<i>M. C. B., Houston & Texas Central, Houston, Tex.</i>
1880	McGregor, James		<i>Home Bank Bldg., Detroit, Mich.</i>
1882	McIlwain, J. D.		<i>12 Alpha Terrace, East End, Pittsburg, Pa.</i>
1893	McKeen, W. R., Jr.		<i>G. F. C. R., Terre Haute & Indianapolis, Terre Haute, Ind.</i>
1883	McKenna, Robt.	27,000	<i>M. C. B., Del., Lackawanna & Western, Scranton, Pa.</i>
1895	McKenna, R. F.		<i>Inspector, Del., Lackawanna & Western, Scranton, Pa.</i>
1894	McMasters, C. J.	224	<i>S. M. P., Bennington & Rutland, Rutland, Vt.</i>
1894	McNaughton, Jas.		<i>Brooks Loco. Works, Dunkirk, N. Y.</i>
1875	McWood, Wm.	26,467	<i>S. C. D., Grand Trunk System, Montreal, Canada.</i>
1889	Macbeth, James.		<i>M. C. B., N. Y. C. & H. R., E Buffalo, N. Y.</i>
1883	Mackensie, John.	7,166	<i>S. M. P., N. Y., Chicago & St. Louis, Clevelan., Ohio.</i>
1896	Maguire, P. J.		<i>M. C. B., Southern Pac. (Atlantic System), Algiers, La.</i>
1896	Maher, P.		<i>M. M., Indiana, Illinois & Iowa, Kankakee, Ill.</i>
1895	Mahl, F. W.		<i>Mch. Engr., Southern Pacific Co., Sacramento, Cal.</i>
1897	Mailier, Jno.	308	<i>M. M., Winona & Western, Winona, Minn.</i>
1895	Manchee, S. H.		<i>Car Acct., Hammond Refrigerator Line, Hammond, Ind.</i>
1895	Manning, J. H.		<i>Div. M. M., Union Pacific, Omaha, Neb.</i>
1882	Marden, J. W.	5,605	<i>S. C. D., Fitchburg, Boston, Mass.</i>
1893	Maris, J. M.		<i>G. M., Illinois Car & Equipment Co., Chicago, Ill.</i>
1897	Marshall, B. F.		<i>M. M., C. A. & C., Mt. Vernon, Ohio.</i>
1886	Martin, M. M.	12,781	<i>S. C. D., Wabash, Decatur, Ill.</i>
1898	Mather, A. C.		<i>Prest. Mather, Stock Car Co., Chicago, Ill.</i>
1887	Meehan, James.	1,395	<i>S. M. P. and M., South Carolina & Georgia, Charles- ton, S. C.</i>
1895	Mendenhall, C. M.	10,000	<i>S. M. P., Phil., Wil. & Balto., Philadelphia, Pa.</i>
1897	Mertsheimer, F.		<i>Supt. M. P. & E., Kansas City, Pittsburg & Gulf, Kansas City, Mo.</i>
1891	Michael, J. B.		<i>M. M. Southern Railway, Knoxville, Tenn.</i>
1891	Middagh, D. B.		<i>G. F., Norfolk & Western, Roanoke, Va.</i>
1896	Middleton, H.	37,298	<i>G. S. M. P., Baltimore & Ohio, Baltimore, Md.</i>
1892	Mileham, C. M.		<i>M. M., Street's Stable Car Line, Chicago, Ill.</i>
1886	Millen, Thos.		<i>G. M. M., Metropolitan Street R'y, 106 West Fifty-first' St., New York City.</i>
1896	Miller, A. T.		<i>Everson, Pa.</i>
1895	Miller, G. A.	576	<i>M. M., Florida East Coast, St. Augustine, Fla.</i>
1884	Miller, G. W.		<i>Buffalo, N. Y.</i>
1877	Miller, Robt.		<i>S. M. P. & E., Michigan Central, Detroit, Mich.</i>
1895	Miller, Wm.		<i>M. C. B., Nelson Morris & Co., Chicago, Ill.</i>
1898	Millholland, J. K.	916	<i>M. M., George's Creek & Cumberland, Cumberland, Ma.</i>
1896	Milliken, J.		<i>A. E. M. P., Phila., Wil. & Balto., Philadelphia, Pa.</i>
1891	Mills, Stott.		<i>Warwick, N. Y.</i>

LIST OF MEMBERS — *Continued.*

DATE.	NAME.	NO. OF CARS OWNED	RAILROAD COMPANY AND ADDRESS.
1895	Miner, W. H. ....	.....	M. E., Hutchin's Refr. Car Co., Chicago, Ill.
1889	Minton, W. D. ....	.....	M. C. B., Texas & Pacific, Marshall, Tex.
1892	Mitchell, A. E.	48,915	S. M. P., Erie, New York, Susquehanna & Western, New York City.
1897	Mitchell, W. M.	68	St. L., K. C. & Colo., St. Louis, Mo.
1894	Monkhouse, H. ....	.....	S. M. P., Chicago & Alton, Bloomington, Ill.
1893	Mooney, P. T.	233	M. C. B., Texas Central, Walnut Springs, Tex.
1893	Morgan, J. B.	6,600	G. M. M., Toledo & Ohio Central, Bucyrus, Ohio.
1889	Morris, W. S.	15,572	S. M. P., Chesapeake & Ohio, Richmond, Va.
1898	Morse, F. H. ....	.....	Supt., Georgia Car & Mfg. Co., Savannah, Ga.
1896	Musson, J. W. ....	.....	G. S. C. D., Mer. Desp. Trans. Co., Rochester, N. Y.
1885	Nelson, E. D.	10,090	S. M. P., P. & E. Div. Pennsylvania, Williamsport, Pa.
1895	Nettleton, W. A.	9,553	S. M. P. & M., K. C., Ft. Scott & Memphis, Kansas City, Mo.
1894	Neuffer, J. G.	7,000	G. M. M., Baltimore & Ohio South-Western, Cincin- nati, Ohio.
1897	Neward, F. H.	122	M. M., Pontiac, Oxford & Northern, Pontiac, Mich.
1898	Newell, T. W.	1,405	Atlanta, Knoxville & Northern, Blue Ridge, Ga.
1897	Nicholas, R. H.	608	Supt., N. Y., Phila. & Norfolk, Cape Charles, Va.
1897	Nuttall, W. H.	295	M. M., Manistee & North-Eastern, Manistee, Mich.
1888	O'Brien, Jno. H. ....	.....	M. C. B., Mexican Central, City of Mexico, Mex.
1897	O'Donnell, Thos. ....	.....	G. F. C. D., Houston, East & W. Tex., Houston, Tex.
1896	O'Herin, W. ....	.....	S. M. & E., Missouri, Kansas & Texas, Parsons, Kan.
1897	O'Leary, D.	538	M. M., Seattle & International, Seattle, Wash.
1893	Orchard, J. H. ....	.....	M. C. B., Delaware & Hudson Canal, Carbondale, Pa.
1896	Page, W. B. ....	.....	A. E. M. P., Phila. & Erie Div., P. R. R. & Nor. Cen- tral, Williamsport, Pa.
1897	Parent, A. M. ....	.....	Mgr., Pullman Car Works, Pullman, Ill.
1896	Parker, T. E. ....	.....	M. C. B., Armour Packing Co., Kansas City, Mo.
1890	Pattee, Jos. O.	18,028	S. M. P., Great Northern, St. Paul, Minn.
1889	Paxson, L. B.	30,228	S. M. P. and R. E., Phila. & Reading, Reading, Pa.
1896	Pease, F. J.	4,164	Toledo, St. Louis & Kansas City, Frankfort, Ind.
1889	Peck, Peter H.	150	M. M., Chicago & West'n Ind. & Belt, 83d St., Chi- cago, Ill.
1898	Peddle, W. H. ....	.....	Gen'l Supt. Maintenance, Southern, Washington, D. C.
1896	Pennock, Willard. ....	.....	Prest., Minerva Car Works, Minerva, Ohio.
1896	Petrie, J. R. ....	.....	Chief Joint Car Insp., Buffalo, N. Y.
1898	Pettingill, Waldo.	119	Portland & Rumford Falls, Rumford Falls, Me.
1896	Pew, R. C. ....	.....	S. C. D., Bay Terminal, Toledo, Ohio.
1895	Pflager, H. M. ....	.....	M. E., Pullman Palace Car Co., Chicago, Ill.
1898	PHILLIPS, E. A. ....	.....	EDITOR, RAILROAD CAR JOURNAL, NEW YORK CITY.
1890	Player, John.	25,127	S. M., Atch., Topeka & Santa Fe, Topeka, Kan.
1896	Pollitt, Harry. ....	.....	Loco. and Marine Engineer, Great Central, Gorton, Manchester, England.
1890	Porcher, Sam'l. ....	.....	Asst. P. A., Pennsylvania, Philadelphia, Pa.
1893	Potter, G. L.	40,717	S. M. P., Pennsylvania Co., Ft. Wayne, Ind.
1896	Prescott, C. H.	300	M. M., Spokane Falls & Northern, Spokane, Wash.

LIST OF MEMBERS—Continued.

DATE.	NAME.	NO. OF CARS OWNED.	RAILROAD COMPANY AND ADDRESS.
1885	Preston, H. L.	8,775	M. C. B., Chi., St. P., Minn. & Omaha, Hudson, Wis.
1891	PROUT, H. G. ....	.....	THE RAILROAD GAZETTE, 32 PARK PLACE, NEW YORK.
1896	Purves, T. B., Jr.	6,129	S. R. S., Boston & Albany, Springfield, Mass.
1897	Quackenbush, A. W.	116	St. Louis, Cape Girardeau & Ft. Smith, Cape Girardeau, Mo.
1896	Ramsey, J. C.	189	K. C., Watkins & Gulf, Lake Charles, La.
1898	Ramsy, Jno. P. ...	227	G. M., Rio Grande, Sierra Madre & Pacific, El Paso, Tex.
1895	Rasbridge, R. B. ....	.....	G. F., Philadelphia & Reading, Newberry, Pa.
1894	Rearden, Frank ...	14,000	S. L. and C. D., Missouri Pacific, St. Louis, Mo.
1896	Reid, M. M. ....	.....	M. M., Atlantic & Danville, Lawrenceville, Va.
1892	Reynolds, O. H. ...	.....	Assoc. Editor, Locomotive Engineering, New York City.
1885	Rhodes, Godfrey W.	22,925	S. M. P., Chicago, Burlington & Quincy, Aurora, Ill.
1897	Riley, B.	2,033	Iowa Central, Marshalltown, Iowa.
1883	Rielly, Patrick. ....	.....	Lake Erie & Western, Lima, Ohio.
1896	Riley, G. M. D.	4,750	Plant System, Savannah, Ga.
1896	Riley, J. C. ....	.....	Supt. Trans., Manhattan Oil Co., Lima, Ohio.
1896	Roberts, Chas.	2,814	G. F., Cleveland, Akron & Columbus, Mt. Vernon, Ohio.
1896	Roberts, E. M. ....	.....	M. M., South Atlantic & Ohio, Bristol, Tenn.
1895	Roberts, Mord. ....	.....	M. M., St. Louis, Iron Mt. & Southern, Little Rock, Ark.
1885	Robertson, W. J. ...	3,720	M. C. B., Central Vermont, St. Albans, Vt.
1897	Robinson, C. C. ....	.....	M. M., Peoria, Decatur & Evansville, Mattoon, Ill.
1897	Robinson, W. L. ....	.....	G. C. I., Ind., Ill. & Iowa, Kankakee, Ill.
1873	Robson, A. C. ....	.....	M. C. B., Lake Shore & Mich. South'n, Buffalo, N. Y.
1896	Rogers, M. J. ....	.....	M. M., Kansas City Belt, Kansas City, Mo.
1882	Rommell, Geo.	462	M. M., Wilmington & Northern, Wilmington, Del.
1896	Roof, C. S. ....	.....	C. F., Clev., Cin., Chicago & St. Louis, Delaware, Ohio.
1894	Roope, Thos.	500	M. M., Sioux City & Northern, Sioux City, Iowa.
1897	Rumney, Thos.	1,041	M. M., Ogdensburgh & Lake Champlain, Malone, N. Y.
1891	Ryan, J. J. ....	.....	S. M. P., Southern Pacific Co., Houston, Tex.
1895	Sanborn, J. N.	376	M. M., Brainerd & Northern Minnesota, Brainerd, Minn.
1892	Sanderson, R. P. C. ....	.....	Div. M. M., Norfolk & Western, Roanoke, Va.
1889	Sample, N. W.	7,881	Gen'l Supt., Denver & Rio Grande, Denver, Colo.
1897	Schaefer, Hugo.	524	M. M., Phila., Reading & New England, Hartford, Conn.
1892	Schaffer, M. B. ....	.....	G. F. C. D., Missouri Pacific, St. Louis, Mo.
1885	Schlacks, Henry. ....	.....	S. M., Denver & Rio Grande, Denver, Colo.
1887	Schroyer, Chas. A. ...	36,743	S. C. D., Chicago & North-Western, Chicago, Ill.
1896	Schrt, H. M.	4,700	M. M., Ohio Southern, Springfield, Ohio.
1890	SETCHEL, J. H. ....	.....	PITTSBURGH LOCOMOTIVE WORKS, PITTSBURGH, PA.
1898	Sharp, W. E. ....	.....	G. C. F., Chicago & Erie, Chicago, Ill.
1897	Shearer, R. D. ....	.....	Foreman, N. Y. C. & H. R., Rochester, N. Y.
1897	Shields, Alex.	300	Southern Indiana, Bedford, Ind.
1891	Simons, J. E. ....	.....	A. M. C. B., Pitts. & Lake Erie, McKee's Rocks, Pa.

LIST OF MEMBERS.— *Continued.*

DATE.	NAME.	NO. OF CARS OWNED.	RAILROAD COMPANY AND ADDRESS.
1889	SINCLAIR, ANGUS		LOCOMOTIVE ENGINEER, 256 BROADWAY, NEW YORK.
1897	Skinner, Calvin ...	3,420	<i>Alabama Great Southern, Birmingham, Ala.</i>
1884	Skinner, J. R.		F. C. R., Del. & Hudson Canal Co., Oneonta, N. Y.
1890	Small, H. J.		S. M. P. and E., Southern Pacific, Sacramento, Cal.
1893	Smith, A. D.	520	<i>Gen'l Supt., Cornwall & Lebanon, Lebanon, Pa.</i>
1870	Smith, C. A.		M. C. B., Union Tank Line, 26 Broadway, New York City.
1893	Smith, F. B.		G. M. M., N. Y. N. H. & H., New Haven, Conn.
1898	Smith, Geo. W.	1,843	<i>Santa Fe Pacific, Albuquerque, N. M.</i>
1897	Smith, R. E.		S. M. P., Atlantic Coast Line, Wilmington, N. C.
1896	Smith, Van.	157	<i>Zanesville & Ohio River, Zanesville, Ohio.</i>
1898	Smitham, N. L.	290	<i>M. M., Texas Midland, Terrell, Texas.</i>
1894	Sollers, Geo. B.		Toledo & Ohio Central, Kenton, Ohio.
1891	Soule, R. H.		Baldwin Loco. Works, 1217 Monadnock Bldg., Chicago, Ill.
1897	Spalding, E. C.		G. M., Southern Iron Car Line & Express Coal Line, Atlanta, Ga.
1897	Spoor, C. E.		F. C. D., Buffalo & Susquehanna, Galetton, Pa.
1895	Sprigg, Z. T.		Div. M. M., Union Pacific, Denver, Colo.
1892	Stark, F. H.	4,000	<i>M. C. B., Cleveland, Lor. & Wheeling, Lorain, Ohio.</i>
1895	Starr, P. F.		Florida East Coast, St. Augustine, Fla.
1893	Steinbrenner, A. G.		M. C. B., Am. Refrig. Transit Co., St. Louis, Mo.
1895	Stewart, O.	1,375	<i>S. M. P., Bangor & Aroostook, Oldtown, Me.</i>
1897	Stiffey, S. S.		M. M., Col., Hocking Valley & Toledo, Columbus, Ohio.
1893	Stover, C. W.		G. M., Chicago & South Bend, South Bend, Ind.
1892	Summerskill, T. A.	276	<i>M. M., Man. & North-Western, Portage la Prairie, Man.</i>
1895	Swift, H. H.		G. F. C. R., Cin., Hamilton & Dayton, Lima, Ohio.
1897	Tawse, R.	1,874	<i>M. M., Ann Arbor, Owosso, Mich.</i>
1895	Taussig, J. E.	12	<i>Supt. Wheeling Bridge & Ter., Wheeling, W. Va.</i>
1880	Taylor, Jos.		Michigan Peninsular Car Co., Detroit, Mich.
1895	Teufer, Jno.		F. C. D., West Shore, Frankfort, N. Y.
1894	Thoma, Frank	500	<i>Supt., Madison, Alton & Chicago, St. Louis, Mo.</i>
1896	Thomas, C. F.		M. M., Southern, Alexandria, Va.
1898	Thomas, J. J., Jr.	330	<i>M. M., Mobile & Birmingham, Mobile, Ala.</i>
1888	Thomas, W. H.	21,933	<i>S. M. P., Southern, Washington, D. C.</i>
1894	Thomson, B. E.		Chief Joint Car Inspector, Williamsport, Pa.
1892	Thompson, C. A.	19,909	<i>S. M. P. and E., Central of N. J., Jersey City, N. J.</i>
1896	Thompson, Geo.	4,830	<i>M. M., Beech Creek, Jersey Shore, Pa.</i>
1892	Tomlinson, J. J.		Mexican Northern, Escalon, Chihuahua, Mex.
1895	Tomlinson, J. G. ..	2,908	<i>S. M. P., New Orleans & North-Eastern, Alabama & Vicksburg, and Vicksburg, Shreveport & Pacific, Meridian, Miss.</i>
1894	Tonge, John	2,440	<i>M. M., Minneapolis & St. Louis, Minneapolis, Minn.</i>
1894	Torrance, John.	4,162	<i>S. M. P. and R. E., Evansville & Terre Haute, Evansville, Ind.</i>
1882	Townsend, Joseph.	7,660	<i>M. C. B., Chicago & Alton, Bloomington, Ill.</i>
1892	Toy, E. L.	30	<i>Supt., Barborton Belt Line, Barborton, Ohio.</i>

LIST OF MEMBERS — *Continued.*

DATE.	NAME.	NO. OF CARS OWNED.	RAILROAD COMPANY AND ADDRESS.
1895	Tubbs, F. E.	532	M. M., Jack., Tampa & Key West, Palatka, Fla.
1892	Turner, C. E.	6,950	S. M. P., B. R. & P., Rochester, N. Y.
1895	Turner, J. S.	2,052	S. M. P., West Virginia Central & Pittsburgh, Elkins, W. Va.
1889	Turner, L. H.	6,818	M. of M., Pittsburgh & Lake Erie, McKee's Rocks, Pa.
1890	Tyrrell, Thos.	103	M. M., Staten Island Rapid Transit, Foot Whitehall St., New York City.
1883	Vail, Allen.	8,000	G. M. M., Western New York & Penn., Buffalo, N. Y.
1898	Van Alstine, D.	777	M. M., Louisv'e, Henderson & St. Louis, Cloverport, Ky.
1892	Van Brunt, G. E.	1,299	M. M., Penna. & North-Western, Bellewood, Pa.
1894	Van Houten, I. W. ....	.....	F. C. R., Pennsylvania, Philadelphia, Pa.
1892	Vogt, A. S. ....	.....	M. E., Pennsylvania, Altoona, Pa.
1889	Voss, Wm. ....	.....	Jackson & Sharpe Co., Wilmington, Del.
1890	Waitt, A. M.	20,082	G. M. C. B., Lake Shore & Mich. Southern, Cleve- land, Ohio.
1896	Wagner, J. R.	1,521	S. M. P., Dela., Susqu. & Schuylkill, Drifton, Pa.
1896	Waldo, A. ....	.....	G. F. C. D., Little Rock & Memphis, North Little Rock, Ark.
1896	Walton, Geo. S. ....	.....	Inspector, Pennsylvania, Altoona, Pa.
1887	Ward, Chas. F. ....	.....	M. M., Duluth, Superior & Western, Cloquett, Minn.
1893	Watts, A. H. ....	.....	M. M., Cincinnati Northern, Van Wert, Ohio.
1894	Waughop, Chas. ....	.....	Chief Joint Car Inspector, St. Louis, Mo.
1871	Webster, H. A. ....	.....	Manhattan Elevated, 71 Broadway, New York City.
1897	Weir, Henderson. ....	.....	Harlan & Hollingsworth Co., Wilmington, Del.
1887	Welch, Benjamin.	16,519	M. C. B., So. Pacific (Pacific System), Sacramento, Cal.
1890	West, Geo. W.	6,622	S. M. P., N. Y., Ontario & West'n, Middletown, N. Y.
1897	Westervelt, Jos. ....	.....	M. C. B., N. Y. C. & H. R., E. Rochester, N. Y.
1895	Whitaker, W. H.	250	M. M., Des Moines, Nor. & West'n, Des Moines, Iowa.
1886	White, David. ....	.....	G. C. F., Intercolonial of Canada, Moncton, N. B.
1898	Whyte, F. M. ....	.....	M. E., Chicago & North-Western, Chicago, Ill.
1882	Wicke, Caspar.	735	F. C. R., Cumberland Valley, Chambersburg, Pa.
1897	Wigton, J. L. ....	.....	M. C. B., M. K. & T., Sedalia, Mo.
1886	Wilbar, Kollin H. ....	.....	Genl. Supt., Lehigh Valley, Bethlehem, Pa.
1891	Wilcox, W. J.	318	M. M., Ohio River & Charleston, Blacksburg, S. C.
1890	Williams, E. A.	7,053	M. S., M. St. P. & S. Ste. Marie, Minneapolis, Minn.
1897	Williams, J. F. ....	.....	S. C. S., Berwind-White Coal Min'g Co., Harrisburg, Pa.
1895	Wilson, G. F.	16,955	S. M. P. and E., Chicago, R. I. & Pac., Chicago, Ill.
1898	Witmer, J. W. ....	.....	M. M., Detroit, Toledo & Milwaukee, Marshall, Mich.
1897	Wright, F. W. ....	.....	C. F., Great Northern, Great Falls, Mont.
1890	Wood, I. E. ....	.....	G. C. I., Baltimore & Ohio, Mt. Clare, Baltimore, Md.
1895	Worhle, John.	3,561	G. F. C. D., Col., Sandusky & Hocking, Columbus, Ohio.

Total number of cars, 1,252,219.

CONSTITUTION.

ARTICLE I.

NAME.

SECTION 1. The name of the Association shall be "The Master Car Builders' Association."

ARTICLE II.

OBJECTS AND LIMITS OF ACTION.

SECTION 1. The objects of this Association shall be the advancement of knowledge concerning the construction, repair and service of railroad cars, by discussions in common, investigations and reports of the experience of its members; to provide an organization through which the members, and the companies they represent, may agree upon such joint action as may be required to bring about uniformity and interchangeability in the parts of railroad cars, to improve their construction, and to adjust the mutual interest growing out of their interchange and repair; but the action of the Association shall have only a recommendatory character, and shall not be binding upon any of its members or the companies represented in it.

ARTICLE III.

MEMBERSHIP.

SECTION 1. There shall be three classes of members — Active, Representative and Associate Members. Each member must sign the Constitution or authorize the Secretary to sign for him.

SEC. 2. Any person holding the position of Superintendent of the Car Department, Master Car Builder, Foreman of a Railroad Car Shop, Joint Car Inspector, or one representative from each Car Manufacturing Company, or other company owning over one thousand cars, which are not in process of purchase by other parties, may become an Active Member by paying his dues for one year. Unless expelled from the Association his membership shall continue until his written resignation is received by the Secretary.

SEC. 3. Any person having a practical knowledge of car construction may become a Representative Member by receiving a *written* appointment from the President, General Manager or General Superintendent of any railroad company to represent its interests in the Association; provided that no Representative Member shall represent more than one railroad or system of roads under one General Manager or General Superintendent. Such member shall have all the privileges of an Active Member, including one vote on all questions, and in addition thereto shall, on all measures pertaining to the adoption of standards or the expenditure of money, have one more

vote for each full one thousand cars which are owned, or which are in use and in process of purchase by the road or system which he represents. His membership shall continue until notice is given the Association of his withdrawal, or of the appointment of his successor. No railroads or system of roads, under one General Manager or General Superintendent, shall have more than one Representative Member. In the enumeration of four, six, eight or more wheeled cars, four axles to count as one car.

SEC. 4. Civil and mechanical engineers, or other persons having such a knowledge of science, or practical experience in matters pertaining to the construction of cars, as would be of especial value to the Association or railroad companies, may become Associate Members on being recommended by three members not associates. The names of such candidates shall then be referred to the Executive Committee, which shall report to the Association on their fitness for such membership. They shall be elected by ballot at any regular meeting of the Association, held not less than six months after a candidate has been proposed, and five dissenting votes shall reject. The number of Associate Members shall not exceed twenty. Associate Members shall be entitled to all the privileges of Active Members, excepting that of voting and being elected to office in the Association.

SEC. 5. Any member who, during the meetings of the Association, shall be guilty of dishonorable conduct which is disgraceful to a railroad officer and a member of the Association, or shall refuse to obey the Chairman when called to order, may be expelled by a vote of two-thirds of the members present at any meeting held within one year from the date of the offense.

ARTICLE IV.

OFFICERS.

SECTION 1. The officers of the Association shall be a President, three Vice-Presidents, a Treasurer, Secretary, and six Executive Members. The six Executive Members, with the President, Vice-Presidents and Treasurer, shall constitute the Executive Committee.

ARTICLE V.

DUTIES OF OFFICERS.

SECTION 1. The duties of all officers shall be such as usually pertain to their offices, or may be delegated to them by the Executive Committee of the Association.

ARTICLE VI.

EXECUTIVE COMMITTEE.

SECTION 1. The Executive Committee shall exercise a general supervision over the interests and affairs of the Association, recommend the amount of the annual assessment, call, prepare for and conduct general conventions, and make all necessary purchases, expenditures and contracts required to conduct the current business of the Association, but shall have no power to make the Association liable for any debt to an amount beyond that which at the time of contracting the same shall be in the

Treasurer's hands in cash, and not subject to prior liabilities. All expenditures for special purposes shall only be made by appropriations acted upon by the Association at a regular meeting.

SEC. 2. The Executive Committee shall make a report of the proceedings of each of its meetings, such reports to be made accessible to all the members of the Association. It shall have the proceedings of the regular meetings of the Association published, subject to instructions from the latter. It shall have power to withhold from the published proceedings, papers and reports containing old matter readily found elsewhere, those specially meant to advocate personal interests, those carelessly prepared or controverting well-established facts, and those purely speculative or foreign to the purposes of the Association, or any which, in the opinion of the committee, are unworthy of publication; it being understood that this discretion shall always be exercised subject to the action of the Association.

SEC. 3. Two-thirds of the members of the Executive Committee may call special meetings of the Association, to be held not less than thirty days after a notice thereof has been mailed to each member of the Association.

SEC. 4. Five members of the Executive Committee shall constitute a quorum for the transaction of business.

ARTICLE VII.

ELECTION AND APPOINTMENT OF OFFICERS, AND TENURE OF OFFICE.

SECTION 1. The officers, excepting as otherwise herein provided, shall be elected at the regular meeting of the Association, held in June of each year, and the election shall not be postponed except by unanimous consent.

PRESIDENT AND TREASURER.

SEC. 2. The President and Treasurer shall be elected by written ballots by a majority of the votes cast, and shall hold office for one year, or until successors are chosen.

VICE-PRESIDENTS AND EXECUTIVE MEMBERS.

SEC. 3. The Vice-Presidents shall hold office for one year, and Executive Members for two years, or until successors are chosen. Three Vice-Presidents and three Executive Members to be elected each year; provided, however, that three of the latter shall be appointed by the president holding office at the time of the adoption of this amendment. The Executive Members thus appointed to hold office until successors are chosen at the annual meeting following.

SEC. 4. In the election of Vice-Presidents each Active and Representative Member may cast as many votes as there are Vice-Presidents to be elected. The number of votes may be given to one candidate or distributed among more, as the person entitled to cast them may choose. Executive Members shall be voted for in the same way. The three candidates for each of the offices named who receive the largest number of votes shall be declared elected.

SECRETARY.

SEC. 5. A Secretary, who may or may not be a member of the Association, shall be appointed by a majority of the Executive Committee at its first meeting after the

annual election, or as soon thereafter as the votes of a majority of the members of the Executive Committee can be secured for a candidate. The term of office of the Secretary thus appointed, unless terminated sooner, shall cease at the first meeting, after the next annual election succeeding his appointment, of the Executive Committee organized for the transaction of business. Two-thirds of the members of the Executive Committee shall, however, have power to remove the Secretary at any time. His compensation, if any, shall be fixed for the time that he holds office by a vote of a majority of the Executive Committee. He shall also act as Secretary of the Executive Committee.

TREASURER.

SEC. 6. The Treasurer shall be required to give bonds to an amount which a majority of the members of the Executive Committee demand. No bill shall be paid by him for the Association, excepting for current expenses, until it has been certified by the person or persons authorized to contract it, and audited by the Executive Committee.

ARTICLE VIII.

COMMITTEES.

SECTION 1. At the first session of the annual meeting the President shall appoint a Nominating Committee of five members, who are not officers of the Association, and this committee shall send the names of nominees for officers of the Association to fill vacancies for the ensuing year to the Secretary before the election of officers is in order, and they shall be announced by him as soon as received. The election shall not be held until the day after such announcement, except by unanimous consent. Any three other members may nominate candidates for any office.

AUDITING COMMITTEE.

SEC. 2. At the first session of each annual meeting an Auditing Committee, consisting of three members not officers of the Association, to be nominated by any member who does not hold office, shall be elected in the same way as Vice-Presidents and Executive Members are voted for. This Auditing Committee shall examine the accounts and vouchers of the Treasurer and certify whether they have been found correct or not. After the performance of this duty they shall be discharged by the acceptance of their report by the Association.

COMMITTEE ON SUBJECTS FOR INVESTIGATION AND DISCUSSION.

SEC. 3. At each annual meeting the President shall appoint a committee whose duty it shall be to report at the next annual meeting subjects for investigation and discussion, and if the subjects are approved by the Association, the President, as hereinafter provided, shall appoint committees to report on them. It shall also be the duty of the committee to receive from members questions for discussion during the time set apart for that purpose. This committee shall determine whether such questions are suitable ones for discussion, and, if so, they shall so report them to the Association.

COMMITTEES OF INVESTIGATION.

SEC. 4. When the Committee on Subjects has reported and the Association approved of subjects for investigation, the President shall appoint special committees

to investigate and report on them, and he may be authorized to appoint a special committee to investigate and report on any subject which a majority of the members present may approve of.

ARTICLE IX.

THE RECOMMENDATION OF STANDARDS.

SECTION 1. Any proposition recommending the adoption of standard constructions or practice shall be in writing and be accompanied by drawings if the latter are necessary for a clear understanding of the subject. Such proposition shall then be submitted to the Association for discussion, after which a vote shall be taken to decide whether the proposition shall be submitted for decision by letter ballot to all the members entitled to vote. If decided in the affirmative the Secretary, within three months from the time the vote of the Association is taken on such measure, shall send by mail to each member a blank ballot, and a copy of the proposed recommendation, with a report — to be approved by the Executive Committee — of the discussion thereon. Such ballot to be filled up, signed and remailed to the Secretary, who shall count all the ballots received within thirty days from the date that they were sent to members, and he shall then announce the vote in such manner as the Executive Committee may prescribe. Any recommendation securing two-thirds of the votes cast shall be adopted by the Association.

SEC. 2. All reports, resolutions and recommendations involving the use, or proposed use, by railroad companies, of any device or process which forms the subject matter of any existing patent, shall first be submitted to the Executive Committee, and shall be submitted to the Association only by the Executive Committee.

ARTICLE X.

ANNUAL CONTRIBUTIONS.

SECTION 1. Every member will be subject to the payment of annual dues, to be assessed at each annual meeting, to defray the necessary expenses of the Association, provided that no assessment shall exceed \$8. Each Representative Member shall pay, in addition to his own dues so assessed, the same amount for each additional vote to which he is entitled.

Such dues shall be payable when the amount thereof is announced by the President at each annual meeting, and no member who is one year in arrears shall be entitled to a voice in the Association. The name of any member who is three years in arrears for dues may be struck from the list of members at the discretion of the Executive Committee.

ARTICLE XI.

AMENDMENTS.

SECTION 1. This Constitution may be amended at any regular meeting by a two-thirds vote of the members present, *provided* that written notice of the proposed amendment has been given at a previous meeting at least six months before.

BY-LAWS.

TIME OF MEETING.

I. The regular meeting of the Association shall be held annually on the second Wednesday in June.

HOURS OF SESSION.

II. The regular hours of session shall be from 10 A.M. to 1:30 P.M. on the opening day and from 9 A.M. to 1:30 P.M. on other days.

PLACE OF MEETING.

III. The place for each annual meeting shall be fixed at least six months before the date for the annual meeting, by a committee consisting of the President, three Vice-Presidents, and the Secretary, acting jointly with a committee of the American Railway Master Mechanics' Association.

QUORUM.

IV. At any regular meeting of the Association fifteen or more members entitled to a vote shall constitute a quorum.

ORDER OF BUSINESS.

V. The business of the meetings of the Association shall, unless otherwise ordered by a vote, proceed in the following order :

- 1st. Prayer.
- 2d. Reading the minutes of the last meeting.
- 3d. Address by the President.
- 4th. Admission of new members.
- 5th. Reports of Secretary and Treasurer.
- 6th. Assessment and announcement of annual dues.
- 7th. Appointment of Nominating and other committees.
- 8th. Election of Auditing Committee.
- 9th. Unfinished business.
- 10th. New business.
- 11th. Reports of committees.
- 12th. Reading and discussing questions propounded by members.
- 13th. Routine and miscellaneous business.
- 14th. Election of officers.
- 15th. Adjournment.

**RULES GOVERNING THE CONDITION OF, AND REPAIRS TO, FREIGHT CARS FOR THE
INTERCHANGE OF TRAFFIC.**

VI. The revision of the Rules of Interchange shall be the special order of business at 10 o'clock A.M. on the second day of each annual convention, unless otherwise ordered.

QUESTIONS FOR DISCUSSION, SPECIAL ORDER OF.

VII. Unless otherwise ordered the discussion of questions proposed by members shall be the special order at 12 o'clock M. of each day of the annual meeting.

DECISIONS.

VIII. The votes of a majority of the members present shall be required to decide any question, motion or resolution which shall come before the Association, unless otherwise provided.

DISCUSSIONS.

IX. No questions or discussions as to the regulation of wages, or the amount to be paid by the day, week or month, or the number of hours that shall constitute a day's work of employes, shall be allowed at the meetings of this Association.

X. No patentees or their agents shall be admitted in the meetings of the Association for the purpose of advocating the claims of any patent, or patentee, unless by unanimous consent.

XI. No member shall speak more than twice in the discussion of any question until all the other members who want to speak and have not been heard have spoken.

XII. Before a motion to close or end a discussion is submitted to a vote, the Chairman shall ask the question whether any other members desire to speak on the subject matter now before the convention, and he shall give an opportunity to any who wish to speak to say so. The motion shall then be submitted to a vote, and the proceedings be governed in accordance with the action of the Association.

REPORT OF THE PROCEEDINGS
OF THE
THIRTY-SECOND ANNUAL CONVENTION
OF THE
MASTER CAR BUILDERS' ASSOCIATION
HELD AT
SARATOGA, NEW YORK,
JUNE 15, 16 AND 17, 1898.

The Convention was called to order by President Crone at 10:15 A.M., on Wednesday, June 15, 1898, in the Theater Saratoga, Saratoga, New York.

Bishop Newman offered prayer.

THE PRESIDENT: Ladies and Gentlemen,—We are honored today in having with us Mr. A. P. Knapp, president of the village of Saratoga Springs, who will now address the convention. [Applause.]

MR. KNAPP: Mr. President, and Gentlemen of the Master Car Builders' Association,—It gives me great pleasure, and I deem it a privilege, to meet and welcome you this morning at the opening of your thirty-second annual convention and the sixth time of your meeting at Saratoga Springs. Speaking for the citizens of our village, I desire to assure you that they feel a great pride in being again honored with the presence of a body of men whose work is of such vast importance to the great business interests of this country. We regard your repeated visits here as a high compliment to the attractions and the advantages of Saratoga as a convention town, and coming from men who are accustomed to having good things—men who know a good thing when they see it—the compliment is thoroughly appreciated. The freedom of the village has been extended to you in

former years, and I desire to assure you that the same holds good today, with all the word "freedom" implies. You may interpret the word to mean, "Go where you will, do what you will," only strive to extract all the pleasure possible from your stay in Saratoga. [Applause.] I believe it is customary for speakers on an occasion of this kind to point out the various attractions of the town, but your acquaintance with Saratoga renders this unnecessary. Many, or all of you, have been here before and know all about our town—our pleasant drives, our lovely parks, our lakes and our immense and splendidly conducted hotels are all familiar objects to you. You know where the pleasant and invigorating waters are, and when and how much and how often to imbibe. [Laughter.] For prescriptions and advice as to the use of other liquids we refer you to the ladies. [Applause.] I am gratified to see so many ladies with you. Their presence is a benediction, and I wish I could express to them a sentiment clothed in words as gracious and as eloquent as were those spoken by the Governor of Virginia a year ago, but my extreme diffidence will only permit me to assure them that the same sentiments are in my heart. [Applause.] I trust, gentlemen, that your stay in Saratoga will be altogether pleasant to you, and that this meeting of 1898 will be the most successful in the history of your Association, and in closing I desire to express the hope that the years to come may be years of abundant prosperity to you, and that each succeeding year will find you meeting in convention in Saratoga Springs. Mr. President and gentlemen, I thank you. [Applause.]

THE PRESIDENT: President Knapp, your cordial words of greeting have but confirmed the assurance of a hearty welcome of which all were conscious even before you spoke, for no formal speech was needed to make us feel at home in Saratoga Springs. We have been here before. But we realize the honor which you do us in being here today, and on behalf of this Association I wish to thank you and the people whom you represent for the warmth of your welcome. Car builders are so occupied with the details of practical work that they have little time or opportunity for cultivating the arts of oratory. To describe the many charms of this favored spot would require the rare gift of eloquence; therefore, I shall not make the attempt. But, as I am unable to give expression to the pleasure which we all feel in being here—a pleasure which has been much increased by your kindly greeting—our meeting here for the sixth time, and in such large numbers as we see assembled today, is an all-sufficient evi-

dence of the high regard in which Saratoga is held by the Master Car Builders' Association. Again I thank you.

Members of the Convention,—We are fortunate in having with us today a gentleman who represents the department of our State government charged with the supervision and control of the railways. The maintenance of equitable relations between the transportation companies and the public is properly a subject of State concern, and when the laws and regulations are framed with a due regard for the public welfare, without abridging the just privileges of the railways, and where the authorities in whose hands this supervisory power is lodged are mindful of the mutuality of interests subsisting between such corporations and the people, the exercise of such control is altogether salutary. I am sure that this view is sustained by those who have given the subject the most careful consideration. That the gentleman who is now to address us has administered the affairs of his office on these lines is a matter of public record. It gives me great pleasure to introduce the Chairman of the Board of Railroad Commissioners of the State of New York, Col. Ashley W. Cole. [Applause.]

MR. COLE: Mr. President and Members of the Master Car Builders' Association,—I must confess that upon receipt of your letter asking me to deliver the address at the opening of this convention, I was disposed to decline the honor; the audacity of undertaking to speak before such a body of experts rather overawed me. However, it became apparent that I could at least represent the State as a member of the Board of Railroad Commissioners in welcoming you within our borders, while at the same time being careful to disclose as little as possible of my ignorance of car building. For some years I have been familiar with, and lately have given more particular attention to, the aims, purposes and accomplishments of this Association, and can say that the Board of Railroad Commissioners of this State has always appreciated your profession and purposes, and admired both the ingeniousness and progressive character of your efforts, as well as the concreted results. How far the general public are aware of what you have done and are doing in the direction of security, safety and comfort, and even luxury, in passenger equipment, it is difficult to determine, but it must be that the person who within a comparatively few years past traveled in a coach which was fifty per cent less in comfort, convenience and safety than that in which he rides today, must, perhaps unconsciously, note the difference and commend the cause, even

though its source and inspiration be unknown to him. It is often the fate of those who produce results to remain unknown, but the consciousness of worthy achievement successfully performed is often more gratifying to natures capable of the performance than is public applause. There are those, however, outside of the general public, who must appreciate your efforts, and among those is the large and important body of train employees. The decrease in the number of coupling accidents and of accidents due to defective or inefficient system of brakes is beginning to show marked results. Our most recent records in this State, for instance, show that for the year ending June 30, 1896, 17 employes were killed and 338 injured in coupling cars, while for 1897 the figures are but 10 killed and 288 injured, a very material decrease. We always claim some credit for the advancement that has been made in this direction, for as long ago as 1884 the Railroad Commissioners of this State officially recommended the passage of an act, which became a law, and which provided that after July 1, 1886, all freight cars thereafter built or purchased for use in this State should be equipped with automatic couplers. In 1889 an act was passed providing that all persons or corporations operating any line or lines of railway by steam power in this State should equip all of their own engines and freight cars with automatic couplers. You are well aware of the difficulty that was encountered in getting a satisfactory coupler, and when November 1, 1892, arrived the companies had not complied with the law. The Board of Railroad Commissioners thereupon extended the time, as it had power to do under the statute, and in 1893 there were passed two comprehensive laws, one applying to brakes and the other to couplers, superseding the act of 1889. The coupler act provides that twenty per cent of freight cars shall be equipped in each year with the Master Car Builders' type of coupler. The companies have quite generally complied with this act, but it became necessary in December, 1897, to still further extend the time for complete equipment with couplers, and we gave the companies one year longer. At that time the total number of freight cars reported to the board was 227,992, the number equipped with automatic couplers being 169,359. The brake act provides that ten per cent of freight cars shall be equipped with air brakes in each year until 1903. It became necessary in May last to also extend the time for this equipment, which was done, the board exempting the companies from compliance during the years 1897 and 1898.

According to the latest published statistics of the Interstate Commerce Commission, there are in service in the United States 1,221,887 freight cars, of which 500,233, or over one-half, are fitted with automatic couplers, and 379,058, or upward of one-third, with air brakes. There were also in service 33,003 passenger cars, of which 32,413, or all but 590, were equipped with train brakes and 31,846 with automatic couplers. The State of New York holds a preëminent position among the States in this regard, for our latest reports show that the companies reporting to the State Railroad Commission own or lease 227,994 freight cars, of which 169,359, or over 74 per cent, are equipped with self-acting couplers, and 91,878, or about 40 per cent, with train brakes. The total car equipment in passenger service on the roads reporting to our Board is 7,496, of which 7,467 cars are equipped with train brakes and 7,354 with automatic couplers. This New York State brake law provides, in Section 3: "That on and after the first day of January, nineteen hundred and three, it shall be unlawful for any railroad or other company to haul, or permit to be hauled or used on its line or lines within the State, any freight car not equipped with continuous power or air brakes operated from the engine." The Interstate Act provides: "That from and after the first day of January, 1898, it shall be unlawful . . . to run any train . . . that has not a sufficient number of cars in it so equipped with power or train brakes that the engineer on the locomotive drawing such train can control its speed without requiring brakemen to use the common hand brake for that purpose." The suggestion has been made that our State law should be amended so that it shall conform to the Interstate Act in this respect, and so that instead of requiring all cars to be equipped it will be necessary to have but sufficient air to control the train. It is desirable that this should be done, but several doubts as to its feasibility, unnecessary to be discussed now, present themselves to those who examine the subject. You, gentlemen, thoroughly familiar with all that is involved in this question, have opinions of your own thereon. It may be of interest to note that, for instance, in 1885 a New York Central box freight car weighed 22,000 pounds, and of the 16,305 cars then owned by that company only 950 were equipped with patent couplers and none with automatic brakes, while the report for the year ending June 30, 1897, shows the total number of box freight cars to be 28,023, of which 15,567 are equipped with automatic brakes and 27,150 with

automatic couplers. The maximum weight has meanwhile increased to 33,000 pounds. The import of these changes in system needs no explanation or comment.

It was not my intention, when I accepted your invitation, to attempt an extended or elaborate address. I have merely presented one or two ideas and facts which have occurred to me as perhaps proper to be submitted at a meeting of Master Car Builders. Before closing these remarks and as bearing upon the patriotic war in which our nation is now engaged, it may not be amiss in me to direct attention to the great service which the railways are called on to perform in the prosecution of warlike measures and movements. As one who saw service in the Army of the Potomac during the Civil War it was at times my lot when being transported from one point to another, with my regiment or brigade, to ride inside or on top of either freight, cattle or passenger cars—more frequently on cattle cars, with our knapsacks set as pillows on the running boards used by the brakemen. The railways of the country were then means of great strategic importance, but the roads and rolling stock of those times were vastly inferior to those of the present day. In the bringing about of these improvements you, gentlemen, have borne a large and important part. And your services are still more important in the present war, as the designers and builders of trains which carry our brave soldiers from the Atlantic to the Pacific coast for the Army of the Philippines, or to the army camps in the South and points of embarkation on the Gulf of Mexico for transportation to Cuba and Porto Rico. And the genius and constructive ability of the American people, which you so fully and ably represent, in your particular field of effort, added to the justice of the cause in which we are now waging war, is the surest guarantee of the triumph with which this crusade of civilization and humanity must be crowned.

And now I welcome you gentlemen who are not residents of New York State to this imperial commonwealth. I thank you for the honor you have done the State Board of Railroad Commissioners in affording it the opportunity, through its chairman, of appearing before you, and I beg to express for myself and colleagues the belief that the deliberations of your members at this session will be of great benefit to your craft and to the whole people. [Applause.]

THE PRESIDENT : I will call upon Mr. J. H. McConnell to reply to the address of Mr. Cole.

MR. MCCONNELL: Mr. Chairman, Ladies and Gentlemen,—In reply to the able and instructive address of Colonel Cole, I shall only refer in a general way to the results which have been accomplished by the members of the Master Car Builders' Association in the last few years. It is not a very difficult task to recall the old coach of a few years gone by, forty feet in length, heated with a box stove and lighted with candles. This has been superseded by the parlor car, chair car, day coach and the dining car, all equipped with vestibules, lighted by electricity or gas, and heated by the steam from the engine, and equipped with the M. C..B. coupler. The Pullman car of a few years ago was about 55 feet in length. It weighed about 60,000 pounds, and to carry this immense weight it was necessary to put sixteen wheels under the car. The sleeping cars of today will measure 72 feet in length, some of them, or over 80 feet over the vestibules, and weigh 112,000 pounds; and we find it today necessary to put but twelve wheels under it to carry the load. The freight equipment has kept pace with the improvement in the passenger equipment. Twenty-eight years ago the standard box car carried 20,000 pounds. That was shortly followed by the 40,000-pound capacity car, and then came the 50,000, and today the 60,000-pound capacity is the standard freight car of the country. The 20,000-pound capacity car carried 350 bushels of grain; the present car carries 1,000 bushels of grain. The introduction of the refrigerator car has made it possible to concentrate the packing houses in large cities, from which their products are distributed all over the United States. The refrigerator car has played an important part in the transportation of fruits from San Francisco and other California points to the East, and from the South to the North. The railroad companies have been called upon by decrease in rates and excessive competition to construct cars of a greater carrying capacity than 60,000 pounds. The Master Car Builders have been called upon to design cars carrying 80,000 and 100,000 pounds. The development of the western country has brought out the furniture car to carry agricultural implements, wagons, buggies and furniture. When we look back and see what has been accomplished by the members of the Master Car Builders' Association in the last few years, we look forward and wonder what the future has in store for us. [Applause.]

THE PRESIDENT: We will pass to order No. 3, which is the address by the President.

President Crone then delivered his annual address, as follows :

Members of the Master Car Builders' Association, Ladies and Friends :

This is our thirty-second annual convention, and the sixth time we have met in Saratoga Springs. Our meeting occurs at a time when the business of the country is disturbed by war with a foreign power; despite this, however, the condition of the railway business shows a marked improvement in the past year. The large increase in traffic earnings is especially worthy of mention, not only as an evidence of greater prosperity to the railways, but as a sure indication of renewed business activity in all lines, and the passing of the period of depression following the commercial and financial crisis of 1893. The large number of cars built during the past year is also to be mentioned as pointing to the improvement in railway affairs.

At this time the railways are performing a most important service to the country, in the facilities which they are providing for the mobilization of the army, and the concentration of the military forces of the Government at the required points. So quietly has this been done that it has attracted but little attention, yet it constitutes one of the chief sources of our national strength.

There have been some manifestations of impatience at the apparent slowness in despatching a military expedition to reinforce Admiral Dewey; but, had it not been for the splendid railway service of the country, the delay would necessarily have been much greater. May we not express the hope that, long before another meeting of our Association, complete victory may have crowned our arms and that our railways may be engaged in carrying food to the starving and in building up the commerce destroyed by the cruel necessities of war.

The following recommendations and suggestions are offered for the consideration of the Association, in the belief that they are calculated to promote the objects of our organization and to facilitate the transaction of the business for which these conventions are held :

First, I would suggest that Section I of the By-Laws covering the date of meeting or opening day of the convention be changed so as to provide for such opening on the second Wednesday in June instead of the second Tuesday as at present, the former date having been found better suited to serve the general interests, besides effecting a considerable saving of valuable time.

Second, I would recommend that the Constitution be so changed as to admit one railroad commissioner from each State, upon application, to Associate Membership, during his term of office; such application to be voted on at the same session at which it may be received. This will admit such commissioner to the privileges of membership at once, thus saving the delay of one year rendered necessary by the existing provision of the Constitution.

Third, A resolution should be adopted at this convention recommending to the Interstate Commerce Commission the advisability of increasing the maximum height of couplers to 35 or 35½ inches, experience having demonstrated that three inches variation to cover new cars when empty, and old cars when loaded, is not sufficient. For measuring, adjusting and passing cars, I would suggest, as recommended practice, that loaded cars be ¾ inch below maximum height and empty cars 1 inch above minimum height. This would insure that loaded cars, when made empty, and empty cars when loaded, would comply with the law.

Fourth, As the Interstate Commerce Commission has extended the time for the application of Master Car Builders' type of couplers, all companies will be enabled to fulfill the requirements of the safety appliance law, so far as it relates to couplers, and doubtless a general compliance with the law may be expected in the time prescribed.

Fifth, In consequence of the large number of couplers of the Master Car Builders' type in use, and the vast difference in construction and material used, it would seem desirable that a test be adopted as recommended practice, similar to the present test for wheels and axles. This would insure a higher standard of perfection in materials and design.

Sixth, As the rules governing the loading of logs, lumber, structural material, girders, etc., will come up for recommended changes, I would suggest that instructions covering the loading and securing of block stone and rails be included.

Seventh, In cases where the interior of a freight car is damaged by lading, such as acids, oils, etc., I would recommend that the railroad controlling such loading be held responsible, except where special cars are furnished by owners.

Eighth, Owing to the differences of opinion concerning the use of dummy coupling hooks on freight equipment, I would recommend that the matter be referred to letter ballot for decision as to whether this hook should be continued as recommended practice of this Association, or abandoned.

The large expenditure of money required in equipping cars with air brakes makes it incumbent upon us to provide for securing the most satisfactory results from this outlay. In this connection, I would suggest that some action should be taken in reference to adjustment, either by means of automatic devices or that rules be formulated, which would insure closer adjustment and greater efficiency than is possible under present conditions.

Ninth, To obviate the necessity of correcting bills, as well as to avoid the correcting of books in our Auditing Departments, I would recommend that a clause be inserted in the rules providing for the use of M. C. B. Defect Cards for authority to counter-bill where errors may occur on bills. This system has been in operation on a number of the railroads for some time, and results have been very satisfactory.

I would also recommend that standard sizes for bill blanks be adopted.

Tenth, I would respectfully call attention to Rule 4, Section 15, of the Book of Rules. From the different opinions expressed, it would seem desirable to so frame the wording of the section as to make intermediate roads responsible for wrong repairs, unless covered by M. C. B. Defect or Repair Card. In connection with this subject, it is suggested that the status of joint evidence card should be clearly established in the rules, as to whether, when properly signed, it becomes authority to bill or simply a request for authorization to bill.

Eleventh, I would call attention to my recommendation of last year with reference to repair cards, that these cards should not be issued for wheels, axles or brake shoes, nor for any labor or material not exceeding a sum to be determined by the Association, when repairs are properly made. A very great reduction in the number of cards issued would result from such a rule, and, in my opinion, the rule would be more generally complied with.

Twelfth, The noon hour topical discussion is one of the new features of our convention, which serves to bring forth valuable information, and I hope continued interest in this part of our programme will be manifested.

It becomes my sad duty to announce that during the past year we have lost by death Mr. F. J. Ferry. An appropriate record of his life and services will be prepared by the proper committee and published in our Proceedings.

It is also proper to mention the death of Mr. John Mulligan, President of the Connecticut River Railroad, who presided at a meeting held in his office at Springfield, Massachusetts, in May, 1867, from which this Association originated. Mr. Mulligan was then Superintendent of Rolling Stock of the same road, of which he afterward became President. You will remember he attended the convention held here in 1896, and addressed us at that time. Although he never became a member of the Association, he was in sympathy with its aims, and, as president of the meeting above mentioned, he is justly entitled to honor as one of the promoters and organizers of our Association.

The very valuable committee reports which will be presented to the convention are indicative of the painstaking care and thought devoted to their preparation, and I desire to take this opportunity of expressing my thanks to the various committees for their untiring labor during the past twelve months. These committees will present to the Association the benefit of their knowledge, time and experiments, embodying valuable information which cannot fail to further advance the respect and confidence in which our Association is held, and to increase the good will of our superior officers. The Executive and Arbitration Committees are also entitled to lasting gratitude for the loyal support they have rendered in the conduct of affairs during the past year.

Our secretary, Mr. Cloud, is to be commended for the conscientious manner in which he has discharged his duties. The care and thoroughness shown in the preparation of the reports of the conventions for publication and his energetic and efficient discharge of the other duties of the office, are well known to us all.

It is a pleasure to bear testimony to the energy and loyalty of purpose manifested by all the committees and officers with whom I have been associated in the past two years. This spirit happily permeates our entire membership. To their and your cooperation and forbearance I am greatly indebted, and wish here and now to make full acknowledgment of the obligation. With the close of this convention my term as your Chief Executive comes to an end. Having tried to do my duty as it presented itself to me, I shall make no apology for the many shortcomings in discharging the functions of the office to which you called me. Deeply mindful of the honor and responsibility of the position, I retire to the ranks with a sense of relief.

The Master Car Builders' Association is perhaps as remarkable for what it does not do as for what it does. Few technical organizations have more wisely limited the scope of their operations to those things which are their proper concern. The wisdom of our course in this respect is shown in the practical efficiency which we have reached. The railway equipment of this country is superior to that of any other, and the credit for this superiority is largely due to the Master Car Builders' Association. But we cannot rest entirely upon past achievements. The future will present problems equally as difficult as any we have heretofore encountered. As knowledge comes with experience, our thirty-one years of existence justifies the prophecy that in the coming time, as in the past, "Progress" will be our watchword.

THE PRESIDENT: We have with us today Mr. M. C. Andrews, who was one of the organizers and the third president of this Asso-

ciation. We would be very glad to hear a few remarks from Mr. Andrews.

MR. ANDREWS: My friend here on the left nudged me to rise, but he did not hurt me so badly as he hurt my feelings. I rise to make an apology, and then like a good boy will sit down on a back seat, for I have arrived at an age now when I am very much like the engines that we used to run on the Boston & Maine Railroad in 1836, when they had to shut off steam every time they blew the whistle. [Laughter and applause.]

The following members were present at this and subsequent sessions :

Adams, F. D.	Chase, F. A.	Greene, M. D.	Lentz, J. S.
Adams, T. W.	Child, A.	Grieves, E. W.	Lewis, W. H.
Aldcorn, T.	Clarke, I. W.	Groves, J. R.	Lindstrom, C.
Anderson, T.	Cook, J. S.	Hackett, G.	Lungren, W. H.
Anderson, G. T.	Cormack, William.	Hannaford, P. W.	Lyon, T.
Appleyard, W. P.	Cory, C. H.	Harris, W.	McAlpine, A. R.
Apps, W.	Coulter, H.	Haskell, B.	McCarthy, H. C.
Atmur, W. T.	Cowan, J.	Hatswell, T. J.	McConnell, J. H.
Atterbury, W. W.	Crone, S. A.	Hatswell, T. J., Jr.	McGee, J.
Ball, H. F.	Crossman, W. D.	Hawthornthwaite, D.	McKenna, R.
Ballentine, D. W.	Cullen, J.	Hayes, R. T.	McMaster, C. J.
Barber, J. C.	Deacon, E.	Haynes, L. C.	McWood, W.
Bean, J.	Deen, C.	Hayward, H. S.	Macbeth, J.
Benson, E. A.	Demarest, G. W.	Hennessey, J. J.	Mackenzie, J.
Bentley, W. F.	Divine, J. F.	Hickey, J.	Maher, P.
Blackall, R. C.	Dolan, S. M.	Higgins, S.	Manchee, S. H.
Bowen, H. A.	Dow, F.	Hodge, J.	Marden, J. W.
Bray, F. O.	Duff, J. N.	Holtz, D.	Martin, M. M.
Brazier, F. W.	Dunn, J. F.	Horrigan, J.	Mendenhall, C. M.
Brooke, G. D.	Eddy, F. H.	Howard, C. H.	Middleton, H.
Bronner, E. D.	English, R.	Hubbell, I. C.	Milliken, J.
Bryan, H. S.	Fildes, T.	Hufsmith, F.	Miller, William.
Buker, J.	Ford, C. H.	Humphrey, A. L.	Mitchell, A. E.
Bush, S. P.	Foster, G. F.	Johnson, R. H.	Monkhouse, H.
Bushnell, R. W.	Foster, W. A.	Kells, W.	Morris, W. S.
Butler, C. T.	Fowler, W. E.	Kenney, G. W.	Musson, J. W.
Cade, J. R.	Fox, F. L.	Killen, W. E.	Neuffer, J. G.
Carr, W. K.	Frey, N.	Kirby, J.	Newell, T. W.
Carroll, C. H.	Garstang, W.	Kirby, T. B.	Nuttall, W. H.
Carson, H. M.	Gibbs, George.	King, S.	O'Herin, W.
Carson, M. T.	Gilbert, E. B.	Lauer, F. G.	Orchard, J. H.
Chamberlain, J. T.	Goehrs, W. H.	Lawes, T. A.	Parent, A. M.
Charpiot, S. A.	Gorrell, W. G.	Leeds, P.	Parker, T. E.

Peck, P. H.	Roof, C. S.	Smith, Van.	Waitt, A. M.
Peddle, W. H.	Runney, T.	Stark, F. H.	Wagner, J. R.
Pfager, H. M.	Schaefer, H.	Steinbrenner, A. G.	Waughop, C.
Phillips, E. A.	Schlack, H.	Stewart, O.	Webster, H. A.
Potter, G. L.	Schroyer, C. A.	Thomas, W. H.	Westervelt, J.
Rasbridge, R. B.	Sharp, W. E.	Thompson, G.	Whyte, F. M.
Reynolds, O. H.	Shields, A.	Tonge, J.	Witmer, J. W.
Rhodes, G. W.	Simons, J. E.	Townsend, J.	Wohrle, J.
Riley, J. C.	Skinner, J. R.	Turner, J. S.	
Robertson, W. J.	Small, H. J.	Tyrrell, T.	
Robinson, W. L.	Smith, C. A.	Van Brunt, G. E.	

A recess of five minutes was then taken.

After the recess the President inquired the pleasure of the convention in respect to the second order—the reading of the minutes of the last meeting.

MR. RHODES: I move that they stand approved as published.

The motion was carried.

THE PRESIDENT: The next order is No. 5 — the reports of the Secretary and Treasurer.

Mr. Cloud presented the Secretary's report as follows:

SECRETARY'S REPORT.

When the report of proceedings of the 1897 convention was published, the membership was as follows:

Active members	256
Representative members	179
Associate members	5
Total	440

Since that date three active members have resigned, three active members have been appointed representative, seven new names have been added to the list of members and six revert from representative to active membership, making a net increase of seven active members.

Eight railroad companies not heretofore represented have appointed representative members, one representative member died, and the changes in the personnel of sixteen other roads have resulted in twenty-five new names in the list of representative members, making an increase of ten representative members, so that the membership at this date is as follows:

Active members	263
Representative members	189
Associate members	5
Total	457

The number of cars represented is as follows :

At date of publication of last report.....	1,222,482
Revised returns for this year on June 7, 1898	1,247,795

Or an increase since the last report of..... 25,313

Since the date of the last report to the Association, the Secretary has collected, up to June 7, 1898, the date of the closing of the books preparatory to this report, as follows :

To dues collected from members.....	\$7,720.00
“ sale of Rules of Interchange.....	797.62
“ “ “ Reports of Proceedings.....	343.14
“ “ “ Rules for Loading Long Materials.....	390.14
“ “ “ Lithographs and Standards.....	94.97
“ “ “ Air Brake and Signal Instructions	50.60
“ “ “ Arbitration Cases.....	257.37
“ “ “ Miscellaneous Reports and Electros.....	3.25
“ Interest on Bank Balances.....	43.31
Total receipts	\$9,700.40

The disbursements by the Secretary for the same time have been as follows :

By Lithographs.....	\$ 150.00
“ Expenses of Committees	167.60
“ Electros, Zinc Cuts, etc.....	99.92
“ R. W. Ryan, reporting Convention, 1897.....	207.62
“ Tracings, Blue Prints, etc	108.27
“ Printing	3,137.21
“ Telegrams	22.86
“ Salary Secretary, including office rent and clerk	3,000.00
“ Expressage	13.55
“ Stamps and Stamped Envelopes.....	431.92
“ Incidentals, Convention, 1897	95.70
“ Office Stationery and Supplies.....	65.02
“ Exchange	51.35
“ Balance Remitted to Treasurer, June 14, 1898.....	2,149.38

Total disbursements.....\$9,700.40

From the above statement it will be seen that there are no funds belonging to the Association in the hands of the Secretary at this time.

There are no unpaid bills against the Association, nor any outstanding accounts unpaid.

The arrears of unpaid dues at this date amount to \$655, of which \$140 is owed by representative members and \$415 by active members.

A statement of members in arrears, with amounts, is submitted herewith for the information and inspection of members.

The details of dues collected from members during the year is attached hereto as a part of this report.

Respectfully submitted,

JOHN W. CLOUD, *Secretary.*

DETAILS OF DUES COLLECTED FROM MEMBERS.

1897.

June 2	W. K. Carr.....\$	5.00	June 10	O. H. Reynolds....	5.00
" 2	M. A. Garrett....	15.00	" 10	C. S. Roof.....	5.00
" 2	G. A. Miller.....	5.00	" 10	J. J. Ryan.....	5.00
" 10	W. E. Ashley....	5.00	" 10	R. P. C. Sanderson.	5.00
" 10	F. Angevine.....	5.00	" 10	H. J. Small.....	5.00
" 10	W. F. Bentley....	5.00	" 10	Van Smith.....	5.00
" 10	H. C. Bossinger...	5.00	" 10	G. B. Sollers.....	5.00
" 10	F. O. Bray.....	5.00	" 10	O. Stewart.....	5.00
" 10	H. F. Ball.....	5.00	" 10	R. E. Smith.....	5.00
" 10	J. R. Cade.....	5.00	" 10	A. H. Watts.....	5.00
" 10	H. Carlton.....	15.00	" 10	B. Welch.....	85.00
" 10	S. T. Case.....	5.00	" 10	J. Westervelt.....	5.00
" 10	F. C. Cleaver.....	5.00	" 10	J. F. Williams....	5.00
" 10	C. J. Clifford.....	5.00	" 10	J. Doyle.....	5.00
" 10	C. Deen.....	5.00	" 10	M. B. Schaffer....	5.00
" 10	G. W. Demarest...	5.00	" 10	R. D. Shearer....	5.00
" 10	J. F. Devine.....	5.00	" 10	W. A. Love.....	5.00
" 10	G. N. Dow.....	5.00	" 10	R. T. Hayes.....	10.00
" 10	T. Fildes.....	10.00	" 10	C. Waughop.....	5.00
" 10	W. A. Foster.....	10.00	" 10	C. Hackney.....	5.00
" 10	F. L. Fox.....	5.00	" 10	H. Weir.....	5.00
" 10	W. T. Gorrell....	5.00	" 10	S. H. Manchee....	5.00
" 10	J. Glaser.....	5.00	" 10	C. H. Dickerman...	5.00
" 10	J. A. Hanglin....	5.00	" 10	T. A. Fraser.....	5.00
" 10	P. W. Hannaford..	5.00	" 10	J. R. Skinner.....	5.00
" 10	W. H. Harrison....	5.00	" 10	I. N. Keith.....	5.00
" 10	L. C. Haynes.....	5.00	" 10	J. W. Baker.....	5.00
" 10	J. J. Hennessey....	5.00	" 10	A. Sinclair.....	5.00
" 10	J. Hodge.....	5.00	" 10	J. Cowan.....	20.00
" 10	J. M. Holt.....	5.00	" 10	A. Vail.....	5.00
" 10	D. Holtz.....	5.00	" 10	C. J. Clifford.....	15.00
" 10	G. Keiber.....	5.00	" 10	W. G. Brimson....	5.00
" 10	W. Kells.....	5.00	" 10	A. T. Miller.....	5.00
" 10	A. M. Kittredge....	5.00	" 10	J. Fitzgerald.....	5.00
" 10	H. C. McCarthy....	5.00	" 10	P. T. Mooney.....	5.00
" 10	J. D. McIlwain....	10.00	" 10	G. W. Lilley.....	5.00
" 10	J. H. Manning....	5.00	" 10	P. H. Peck.....	5.00
" 10	W. H. Nuttall....	5.00	" 10	C. M. Mileham....	5.00
" 10	W. O'Herin.....	5.00	" 10	A. W. Quackenbush	25.00
" 10	A. M. Parent.....	5.00	" 10	T. A. Summerskill..	5.00
" 10	S. Porcher.....	5.00	" 10	F. Johnson.....	5.00
" 10	R. B. Rasbridge....	5.00	" 10	G. W. Miller.....	5.00

Carried forward... \$245.00

June 10	O. H. Reynolds....	5.00
" 10	C. S. Roof.....	5.00
" 10	J. J. Ryan.....	5.00
" 10	R. P. C. Sanderson.	5.00
" 10	H. J. Small.....	5.00
" 10	Van Smith.....	5.00
" 10	G. B. Sollers.....	5.00
" 10	O. Stewart.....	5.00
" 10	R. E. Smith.....	5.00
" 10	A. H. Watts.....	5.00
" 10	B. Welch.....	85.00
" 10	J. Westervelt.....	5.00
" 10	J. F. Williams....	5.00
" 10	J. Doyle.....	5.00
" 10	M. B. Schaffer....	5.00
" 10	R. D. Shearer....	5.00
" 10	W. A. Love.....	5.00
" 10	R. T. Hayes.....	10.00
" 10	C. Waughop.....	5.00
" 10	C. Hackney.....	5.00
" 10	H. Weir.....	5.00
" 10	S. H. Manchee....	5.00
" 10	C. H. Dickerman...	5.00
" 10	T. A. Fraser.....	5.00
" 10	J. R. Skinner.....	5.00
" 10	I. N. Keith.....	5.00
" 10	J. W. Baker.....	5.00
" 10	A. Sinclair.....	5.00
" 10	J. Cowan.....	20.00
" 10	A. Vail.....	5.00
" 10	C. J. Clifford.....	15.00
" 10	W. G. Brimson....	5.00
" 10	A. T. Miller.....	5.00
" 10	J. Fitzgerald.....	5.00
" 10	P. T. Mooney.....	5.00
" 10	G. W. Lilley.....	5.00
" 10	P. H. Peck.....	5.00
" 10	C. M. Mileham....	5.00
" 10	A. W. Quackenbush	25.00
" 10	T. A. Summerskill..	5.00
" 10	F. Johnson.....	5.00
" 10	G. W. Miller.....	5.00

Carried forward... \$585.00

		<i>Brought forward...</i>	\$585.00
July	8	J. N. Duff.....	5.00
"	8	E. S. Benson.....	5.00
"	8	A. G. Steinbrenner.....	5.00
"	8	I. W. Clarke.....	5.00
"	8	Edward Deacon.....	5.00
"	9	J. B. Morgan.....	35.00
"	9	F. H. Eaton.....	5.00
"	9	C. A. De Haven.....	5.00
"	9	Caspar Wicke.....	5.00
"	9	J. S. Knox.....	5.00
"	10	A. E. Mitchell.....	220 00
"	10	W. M. Mitchell.....	5.00
"	10	F. E. Canda.....	5.00
"	10	J. R. Petrie.....	5.00
"	10	H. Bartlett.....	5.00
"	10	E. C. Spalding.....	5.00
"	10	R. H. Nicholas.....	5.00
"	12	E. D. Nelson.....	55.00
"	12	W. B. Page.....	5.00
"	12	G. W. Butcher.....	5.00
"	12	T. B. Kirby.....	5.00
"	14	Joseph Buker.....	5.00
"	14	H. A. Webster.....	5.00
"	14	William Cormack ..	45.00
"	14	Frank Rearden.....	75.00
"	14	J. R. Groves.....	30.00
"	14	J. H. Davis.....	5.00
"	14	Robert Miller.....	5.00
"	15	J. McNaughten.....	5.00
"	15	W. L. Robinson.....	5.00
"	15	C. E. Turner.....	35.00
"	15	James Cullen.....	30.00
"	15	A. R. Fay.....	5.00
"	15	Charles Collier.....	30.00
"	15	R. L. Herbert.....	5.00
"	15	B. Haskell.....	30.00
"	15	Joseph Taylor.....	5.00
"	15	F. J. Hecker.....	5.00
"	15	J. C. Ramsey.....	5.00
"	15	L. J. Cox.....	5.00
"	15	W. H. Day.....	10.00
"	16	G. W. Rhodes.....	115.00
"	16	W. Forsyth.....	5.00
"	16	W. H. Lungren.....	5.00

Carried forward... \$1,455.00

		<i>Brought forward...</i>	\$1,455.00
July	16	H. Coulter.....	5.00
"	16	J. Milliken.....	5.00
"	16	C. M. Mendenhall..	55.00
"	16	F. D. Casanave.....	5.00
"	17	J. N. Barr.....	115.00
"	17	J. S. Lentz.....	200.00
"	17	R. H. Wilbur.....	5.00
"	17	P. Leeds.....	100.00
"	17	B. Reiley.....	10.00
"	17	J. H. McConnell...	60.00
"	19	Thomas Millen.....	5.00
"	19	L. H. Turner.....	30.00
"	19	J. N. Sanborn.....	5.00
"	19	T. A. Lawes.....	50.00
"	19	Joseph Elder.....	5.00
"	19	J. H. Jackson.....	5.00
"	19	B. R. Hanson.....	5.00
"	19	K. W. Blackwell...	5.00
"	19	F. P. Boatman.....	5.00
"	19	C. J. McMasters....	5.00
"	19	O. H. Jackson.....	5.00
"	19	H. M. Pflager.....	5.00
"	19	James Denver.....	5.00
"	20	Alex. Shields.....	5.00
"	20	E. M. Herr.....	5.00
"	20	C. H. Prescott.....	5.00
"	21	C. W. Stover.....	5.00
"	21	T. B. Purves, Jr....	35.00
"	21	J. E. Taussig.....	5.00
"	21	H. H. Swift.....	5.00
"	21	Allen Vail.....	40.00
"	21	C. H. Kenison.....	25.00
"	21	J. F. Graham.....	20.00
"	21	J. R. Lane.....	5.00
"	21	G. L. Potter.....	205.00
"	21	S. P. Bush.....	65.00
"	21	W. W. Atterbury ..	265.00
"	21	H. M. Carson.....	5.00
"	21	G. S. Walton.....	5.00
"	21	R. N. Durborow...	5.00
"	21	R. T. Garland.....	5.00
"	21	O. Gibson.....	5.00
"	21	J. P. Levan.....	5.00
"	21	J. F. Courson.....	5.00

Carried forward... \$2,905.00

<i>Brought forward...</i>			\$2,905.00
July	22	W. H. Thomas	105.00
"	22	J. W. Musson	5.00
"	22	W. E. Killen	10.00
"	22	John Tonge	15.00
"	23	Joseph Townsend	40.00
"	23	A. L. Humphrey	10.00
"	23	T. E. Parker	5.00
"	23	J. J. Bossinger	15.00
"	23	F. A. Given	5.00
"	23	H. S. Bryan	15.00
"	23	J. L. Greatsinger	5.00
"	24	W. O. Lucas	5.00
"	24	A. Waldo	5.00
"	24	F. J. Pease	25.00
"	24	T. Lyon	30.00
"	24	A. Child	95.00
"	24	W. C. Arp	35.00
"	26	W. D. Minton	5.00
"	26	A. C. Hinckley	10.00
"	26	R. McKenna	135.00
"	26	C. J. Butler	25.00
"	26	T. Tyrrell	5.00
"	26	W. Jennings	10.00
"	26	W. H. Lewis	90.00
"	26	Harry Pollitt	5.00
"	26	B. F. Lowther	5.00
"	26	C. A. Thompson	105.00
"	27	W. R. McKeen, Jr.	5.00
"	27	R. English	15.00
"	27	E. B. Gilbert	15.00
"	28	J. Mailer	5.00
"	28	R. C. Blackall	65.00
"	28	J. R. Wagner	10.00
"	29	J. P. McCuen	20.00
"	29	W. P. Appleyard	5.00
"	29	J. S. Turner	10.00
"	29	S. A. Charpiot	30.00
"	31	J. C. Riley	5.00
"	31	H. A. Bowen	5.00
"	31	H. L. Preston	45.00
"	31	G. E. VanBrunt	10.00
"	31	J. B. Fletcher	5.00
"	31	J. W. Marden	30.00
"	31	F. Hufsmith	10.00

Carried forward... \$4,015.00

<i>Brought forward...</i>			\$4,015.00
July	31	A. D. Smith	5.00
"	31	J. T. Johnstone	10.00
"	31	Edward Kennerdell	5.00
"	31	John Hickey	10.00
Aug.	2	J. M. Mari	5.00
"	2	William Buchanan	230.00
"	2	S. A. Crone	5.00
"	2	C. E. Spoor	5.00
"	2	R. M. Galbraith	25.00
"	2	W. E. Killen	15.00
"	2	E. W. Grieves	180.00
"	2	H. Middleton	5.00
"	2	J. E. Cameron	5.00
"	3	J. Collinson	15.00
"	3	J. Mackenzie	40.00
"	5	C. H. Howard	5.00
"	5	A. M. Waitt	105.00
"	5	W. A. Nettleton	50.00
"	5	G. M. D. Riley	30.00
"	5	R. W. Bushnell	25.00
"	5	John Henney	65.00
"	5	E. D. Bronner	75.00
"	5	P. H. Peck	5.00
"	6	F. W. Brazier	155.00
"	6	J. T. Chamberlain	60.00
"	6	George Rommel	5.00
"	6	J. G. Tomlinson	15.00
"	6	William Apps	95.00
"	6	P. J. Maguire	5.00
"	6	S. S. Stiffey	5.00
"	6	J. B. Braden	30.00
"	6	J. E. Keegan	20.00
"	7	E. P. Lord	20.00
"	7	W. L. Hoffecker	5.00
"	9	T. W. Adams	25.00
"	9	F. W. Johnstone	20.00
"	9	George Thompson	20.00
"	11	J. O. Pattee	80.00
"	11	M. M. Reid	5.00
"	12	D. Hawksworth	50.00
"	12	N. W. Sample	40.00
"	12	H. Schlacks	5.00
"	12	S. D. King	10.00
"	12	J. H. Setchel	10.00

Carried forward... \$5,615.00

<i>Brought forward...</i>		\$5,615.00
Aug. 12	R. F. McKenna	5.00
" 13	M. Donaldson	15.00
" 13	J. Cunningham	10.00
" 13	W. H. Miner	5.00
" 14	W. McWood	140.00
" 14	W. A. Brown	5.00
" 16	W. S. Morris	75.00
" 16	F. A. Chase	25.00
" 16	P. F. Starr	5.00
" 16	T. Roope	5.00
" 18	E. M. Humestone	5.00
" 18	R. E. McCuen	5.00
" 18	F. E. Tubbs	5.00
" 19	M. T. Carson	25.00
" 19	H. S. Hayward	55.00
" 19	W. Augustus	5.00
" 20	G. W. West	35.00
" 23	C. Skinner	20.00
" 23	H. G. Prout	5.00
" 23	L. B. Paxson	155.00
" 24	James McGee	20.00
" 26	J. J. Connolly	20.00
" 26	R. H. Soule	5.00
" 30	P. Maher	5.00
" 30	W. Garstang	80.00
" 30	R. Tawse	10.00
" 30	R. C. Pew	5.00
Sept. 1	R. H. Johnson	5.00
" 1	W. H. Whitaker	5.00
" 2	W. J. Robertson	20.00
" 4	W. C. Ennis	20.00
" 4	E. L. Toy	5.00
" 8	F. Thoma	5.00
" 8	J. Torrance	25.00
" 8	W. H. Whitaker	5.00
" 8	H. G. Bowles	10.00
" 8	C. B. McCullough	5.00
" 8	John Player	130.00
" 8	E. T. Carlton	15.00
" 8	N. Frey	20.00
" 13	W. B. Emmert	5.00
" 13	J. S. Cook	5.00
" 13	D. W. Ballentine	15.00
" 13	M. M. Martin	65.00

Carried forward... \$6,725.00

<i>Brought forward...</i>		\$6,725.00
Sept. 13	John Bean	15.00
" 15	C. A. Schroyer	180.00
" 15	G. F. Wilson	85.00
" 17	G. T. Anderson	5.00
" 20	T. O'Donnell	5.00
" 20	W. E. Fowler	15.00
Oct. 2	T. Anderson	30.00
" 7	W. H. Goehrs	5.00
" 12	S. Austin	5.00
" 13	F. J. Ferry	10.00
" 16	M. J. Rogers	5.00
" 16	W. J. Wilcox	5.00
" 16	G. W. Kenney	5.00
" 16	J. M. Elliott, Jr.	5.00
" 22	J. Worhle	20.00
" 25	G. A. Miller	5.00
" 29	J. B. Michael	5.00
Nov. 2	T. J. Hatswell	20.00
" 3	M. A. Garrett	5.00
" 10	F. H. Stark	25.00
" 12	M. N. Forney	5.00
" 22	H. Close	5.00
Dec. 3	F. Mertsheimer	5.00
" 6	J. Macbeth	5.00
" 14	E. A. Williams	35.00
" 17	A. W. Gibbs	10.00
" 17	S. M. Dolan	5.00
" 20	F. B. Griffith	5.00
" 28	J. G. Neuffer	40.00
1898.		
Jan. 4	D. B. Middagh	5.00
" 8	T. Rumney	10.00
" 12	E. Fisher	5.00
" 12	P. E. Garrison	5.00
" 14	W. Miller	5.00
" 19	J. L. Wigton	5.00
" 19	F. B. Smith	5.00
" 19	T. Downing	5.00
" 21	W. I. Cooke	5.00
" 21	P. Reilly	5.00
" 21	R. Gunn	5.00
" 26	G. L. Foster	5.00
" 27	F. R. F. Brown	35.00
" 31	George Gibbs	5.00

Carried forward... \$7,400.00

<i>Brought forward...</i>			\$7,400.00	<i>Brought forward...</i>			\$7,585.00
Jan.	31	A. Kearney.....	5.00	Mch.	28	J. K. Millholland ..	5.00
Feb.	3	H. S. Huidekoper..	5.00	Apl.	4	T. L. Chubb.....	5.00
"	5	W. R. Stirling.....	5.00	"	8	W. Hassman.....	5.00
"	8	J. McGregor.....	5.00	"	18	W. Lavery.....	5.00
"	8	B. F. Marshall.....	5.00	"	20	C. S. Clark.....	5.00
"	8	F. H. Neward.....	5.00	May	4	F. W. Chaffee	10.00
"	11	F. H. Eddy.....	5.00	"	6	F. H. Morse.....	5.00
"	14	W. Pettingill.....	5.00	"	10	F. W. Mahl.....	5.00
"	15	J. E. Simons.....	5.00	"	11	J. J. Casey.....	5.00
"	24	R. H. Emerson....	5.00	"	12	W. Voss.....	5.00
"	25	W. I. Cooke.....	5.00	"	13	J. E. Doran.....	5.00
"	25	S. Porcher.....	5.00	"	14	B. E. Thomson....	5.00
Mch.	3	W. Harris.....	5.00	"	18	J. S. Patterson....	5.00
"	3	G. F. Gage.....	15.00	"	19	F. G. Lauer.....	5.00
"	7	C. Lindstrom.....	5.00	"	23	C. Graham.....	5.00
"	9	J. Eckhart, Jr.....	5.00	"	24	C. F. Ward.....	5.00
"	16	D. W. Hunter.....	5.00	"	26	G. D. Brooke.....	10.00
"	17	J. C. Barber.....	5.00	"	28	J. Billingham.....	5.00
"	17	J. F. Dunn.....	25.00	"	31	H. Monkhouse....	10.00
"	18	D. White.....	5.00	June	1	H. T. Bruck.....	5.00
"	21	W. I. Cooke.....	5.00	"	1	M. Roberts.....	10.00
"	25	J. J. Sullivan.....	5.00	"	2	R. P. C. Sanderson.	5.00
"	26	C. H. Cory.....	45.00	"	2	C. F. Thomas.....	5.00
<i>Carried forward...</i>			\$7,585.00	<i>Total</i>			\$7,720.00

THE PRESIDENT: You have heard the report of the Secretary. What is your pleasure?

MR. WAITT: I move that it be received and printed in the minutes.

The motion was carried.

THE PRESIDENT: The Treasurer's report is next in order. Mr. Demarest, are you ready to report?

Mr. Demarest, the Treasurer, submitted the following report :

To the President and Members of the Master Car Builders' Association :

Amount on hand at date of last report, June, 1897..... \$6,096.23
 Received June 14, 1898, of John W. Cloud, Secretary..... 2,149.38

Total now in treasury..... \$8,245.61

G. W. DEMAREST, *Treasurer.*

THE PRESIDENT: Gentlemen, you have heard the report of the Treasurer. What is your pleasure in the matter?

MR. GARSTANG: I move that the report be received.

The motion was carried.

THE PRESIDENT: The next order is the assessment and announcement of annual dues.

MR. CLOUD: I would state on behalf of the Executive Committee that it considered the state of the finances of the Association yesterday, and decided to recommend to the Association that the dues per vote be made \$4 for this year; and in case of this not furnishing sufficient funds to pay the running expenses the Executive Committee will instruct the Secretary to draw, for the balance needed, on the Treasurer.

MR. WAITT: I move that the recommendation of the Executive Committee be adopted.

The motion was carried.

MR. CLOUD: I would like to say that, on account of difficulties in making change, keeping records straight, etc., we would be glad if you would wait until you get bills before paying the dues. However, anybody who wants to pay dues at this convention can pay them to Mr. Whyte. Those who pay back dues will of course pay \$5 per vote, while those who pay the dues for this year will pay only \$4 per vote. The dues can be paid here or at Congress Hall.

MR. MACKENZIE: I did not quite catch the drift of the motion that was just passed, and I would like, if I can get a second, to reconsider that vote. I would move that the vote be reconsidered—placing the dues at \$4. (Seconded.)

The motion was lost.

THE PRESIDENT: The next order is the appointing of nominating and other committees.

MR. CLOUD: The Chair announces a Nominating Committee, as follows: R. C. Blackall, J. S. Lentz, W. J. Robertson, A. E. Mitchell, John Hodge. This committee is to nominate officers for the next year, and submit their nominations to the Chair at any time today or tomorrow.

THE PRESIDENT: The next order is the election of an Auditing Committee, to consist of three members who are not officers of the Association. We are now ready for nominations.

MR. GARSTANG: I nominate Mr. A. M. Waitt.

MR. WAITT: I nominate Mr. Garstang.

MR. GEORGE GIBBS: I nominate Mr. Appleyard.

On motion of Mr. Mitchell the nominations were then closed, and the gentlemen named were duly elected an Auditing Committee.

THE PRESIDENT: The next order is unfinished business.

MR. CLOUD: Under this head there are two propositions for associate membership made at the last convention which were considered yesterday by the Executive Committee, which recommends that they be acted upon favorably. One is the nomination of Mr. Walter D. Crossman, of Chicago, editor of the *Railway Master Mechanic*, as associate member, the nomination being made by A. M. Waitt, C. A. Schroyer and Godfrey W. Rhodes. The other is the nomination of Edward A. Phillips, editor of the *Railroad Car Journal*, for associate member, the nomination being made by Mr. Marden, Mr. Chamberlain and Mr. Lentz.

THE PRESIDENT: What action do you wish to take on Mr. Crossman's application?

MR. JOHNSON: I move that the Secretary be instructed to cast the vote for the gentleman.

The motion was carried.

THE PRESIDENT: What action do you wish to take on the application of Mr. Phillips?

MR. JOHNSON: I make the same motion.

The motion was carried.

THE PRESIDENT: The next order is new business.

MR. CLOUD: I know of no new business, but under this head I would like to read some communications which have been handed in. Mr. Rhodes, chairman of the Arbitration Committee, says:

The Arbitration Committee will hold a meeting in this hall at 3 P.M. today, for the purpose of discussing the committee's report on the M. C. B. Rules.

The members of the Master Car Builders' Association interested in the rules are invited to be present.

The following communication is received:

The International Correspondence School, of Scranton, Pennsylvania, whose success in teaching the industrial sciences and practical mechanics and mechanical drawing is probably known to you, will have a private car at Saratoga, at the D. & H. station, June 24, 1898. Will be pleased to have your members visit it and see the practicability of the system and some of the results of the work.

Also the following:

Members of the Master Car Builders' Association desiring return Pullman transportation can obtain the same by applying to Mr. H. N. Pflager, Room 140, Grand Union Hotel

And the following:

To the President and Members of the Master Car Builders' Association:

The Lake Shore & Michigan Southern Railway Company desires to extend the courtesies of its road to any of the members of the Association who desire to return from the convention via that line. Any members desiring transportation over the Lake Shore & Michigan Southern road for themselves or their families can obtain the same by applying to the undersigned.

A. M. WAITT,

General Master Car Builder, L. S. & M. S. Railway.

[Applause.]

And, finally, the following:

A meeting for the revision of the Wagner Rules will be held in Room H, Congress Hall, at 5 P.M., Thursday, the 16th inst.

THE PRESIDENT: Have any of the members anything to offer under the head of new business? If not, we will proceed to the next order. The first report in order is the report of the Arbitration Committee, G. W. Rhodes, chairman.

MR. RHODES: Mr. President, the Arbitration Committee's report has been printed, and it has been customary to defer discussion of that until the discussion of the M. C. B. Rules. I would move that the discussion of the Arbitration Committee's report be taken up at the discussion of the M. C. B. Rules.

The motion was carried.

THE PRESIDENT: The next report is that of the Committee on Supervision of Standards and Recommended Practice of the Association, by Mr. A. M. Waitt, chairman.

Mr. Waitt read the following report:

REPORT OF COMMITTEE ON SUPERVISION OF STANDARDS AND RECOMMENDED PRACTICE OF THE ASSOCIATION.

To the President and Members of the Master Car Builders' Association:

Your Committee on the Supervision of the Standards and Recommended Practice of the Association has given the members an opportunity to suggest any desired modifications of the standards and various recommended practices of the Association, and would beg leave to report as below:

For convenience, all of the several standards and recommended practices are enumerated, each one being followed by such, if any, recommendations as the committee may have to make in reference to it. (References are to the proceedings of 1897.)

STANDARDS.

Page 385,
Sheets 1, 2, 3.

1. Journal Box and Details for Journal, $3\frac{3}{4}$ by 7 inches.

Page 385,
Sheets 4, 5, 6.

2. Journal Box and Details for Journal, $4\frac{1}{4}$ by 8 inches.

Your committee recommends that a note be added on sheets 1 and 2, and on sheets 4 and 5, reading as follows:

"Section of box may be made either circular or square below the center line, provided all the essential dimensions are adhered to."

Committee would also recommend adding an additional note on sheets 2 and 5, reading as follows:

"When journal box is made of malleable iron, reduction in thickness of metal and coring to lighten weight is permissible, provided all the essential dimensions which affect interchangeability and the proper fitting of contained parts, are adhered to."

Committee also recommends the appointment of a special committee to consider and report upon the improvement and perfection of the standard top hinged lid, so that it may more completely exclude dust from the journal box.

Committee would also recommend the appointment of a special committee to recommend forms of standard journal boxes for $3\frac{3}{4}$ by 7 inch and $4\frac{1}{4}$ by 8 inch journals adapted for use with the pedestal type of freight car trucks.

Page 385,
Sheet 7.

3. Axle with Journals $3\frac{3}{4}$ by 7 inches.

Page 386,
Sheet 7.

4. Axle with Journals $4\frac{1}{4}$ by 8 inches.

Page 386,
Sheet 7.

5. Form of Wheel Tread and Flange.

Page 386,
Sheet 7.

6. Wheel Circumference Measure.

Page 386,
Sheet 8.

7. Brake Head and Shoe.

Committee would recommend that the clearance allowed on either side between the central lug of the brake shoe, and the adjacent lugs of the brake head, be reduced $\frac{1}{8}$ inch on each side instead of $\frac{1}{4}$ inch, no change being made in the brake shoe; the reduction in clearance being made on the head, making it in accordance with the general practice at present on all malleable iron brake heads, furnished by manufacturers of metal brake beams. It is deemed advisable that this change be made in order to reduce the excessive play of $\frac{1}{4}$ inch now existing between the central lugs of brake head and shoe.

Page 387,
Sheet 8.

8. Brake Beam.

Page 387,
Sheet 9.

9. Air Brakes — General Arrangement and Details.

Committee would make the following recommendations for change in this standard, to make it conform to the best practice:

First. Change diameter of release valve rod from $\frac{1}{4}$ inch to $\frac{3}{8}$ inch.

Second. Change diameter of truck lever connection, outside hung brakes, from $\frac{3}{4}$ to $\frac{7}{8}$ inch. (Note under title on Sheet 9, and reading of Section 3 on page 387, to be changed accordingly.)

Third. Diameter of hole for cotter in air-brake pin to be shown as $\frac{7}{16}$ inch. Present drawing does not indicate the proper size for this hole.

Fourth. Make addition to note under drawing of truck lever connection for inside hung brakes, making entire note to read as follows :

"If made of material other than malleable iron it must be of equal strength, and if made of round iron or steel must not be less than $1\frac{5}{8}$ inches diameter."

Fifth. Omit dummy coupling from drawing, and show air hose hanging down.

Sixth. Omit words "33 inches or" from dimensions shown for height of air-brake pipe above rail, leaving the dimension $34\frac{1}{2}$ inches as the standard.

10. Pedestal.

Page 387,
Sheet 10.

The committee has no suggestions to make, but calls attention to the fact that a special committee has to report on "Passenger Car Pedestal and Journal Box for Journal $4\frac{1}{4}$ by 8 inches," which report may possibly suggest a line of action in connection with the revision of the design of the present standard pedestal.

11. Automatic Couplers.

As the present design for automatic coupler does not define the length or spread of the guard arm, the committee recommends the appointment of a special committee to consider this matter, and to report at the convention of 1899; and it is suggested that, in addition to the above, the same committee consider the devising of a safety limit gauge for determining when M. C. B. couplers and knuckles are worn beyond the limit of safety.

12. Contour Line and Limit Gauges for Automatic Couplers.

Page 388,
Sheet 11.

13. Yoke or Pocket Strap for M. C. B. Couplers.

Page 388,
Sheet 11.

14. Buffer Blocks and Location.

Page 388,
Sheet 11.

15. Terms and Gauging Points for Wheels and Truck.

Page 388,
Sheet 11.

16. Guard Rail and Frog Wing Gauge.

Page 389,
Sheet 12.

17. Distance between Backs of Flanges of Car Wheels.

Page 389.

18. Standard Reference Gauge for Mounting and Inspecting Wheels and Check Gauge.

Page 390,
Sheet 12.

19. Wheel Flange Thickness Gauge for New Wheels.

Page 390,
Sheet 12.

20. Height of Drawbars.

Page 390.

21. M. C. B. Reports.

Page 390.

22. Pamphlets, Catalogues, Specifications, etc.

Page 390.

23. Screw Threads, Bolt Heads and Nuts.

Page 391.

Committee would call attention to the fact that there is a joint committee representing the Master Car Builders' Association and the Master Mechanics' Association,

which will report at this convention on the subject of "Square Bolt-Heads and Nuts." This report may embody some suggestions affecting these standards.

RECOMMENDED PRACTICE.

- | | |
|---------------------------------------|---|
| Page 395. | 24. Specifications for Cast-Iron Wheels. |
| Page 396. | 25. Guarantee for Cast-Iron Wheels. |
| Page 397,
Plates C, D, E,
F, G. | 26. Axle and Journal Box for Cars of 80,000 Pounds Capacity. |
| | In view of the large number of 80,000-pound capacity cars being built, and after considerable experience already obtained with the axle and journal box and details recommended for cars of 80,000 pounds capacity, your committee would suggest that this Recommended Practice be adopted as a standard, including plates C, D, E and F. |
| Page 398. | 27. Limit Gauges for Round Iron. |
| Page 399. | 28. Check Chains. |
| Page 399. | 29. Marking Cars. |
| Page 399. | 30. Air-Brake Repair Card. |

Committee would recommend that form of defective air-brake card should be changed to conform in general with that shown on page 210 of the 1897 Proceedings.

THE L. S. & M. S. RAILWAY CO.

AIR-BRAKE CUT-OUT CARD.

Applied to Car No. Initials

Date at

By Inspector.

By Cond'r. Train No.

Defects

USE FIGURES TO DESIGNATE DEFECTS.

The Lake Shore & Michigan Southern Railway Co.

AIR-BRAKE CUT-OUT.

CAR CAN BE PLACED BETWEEN AIR-BRAKE CARS.

Car No.	Initials	Date	Train No.																				
Card Applied at																							
<table border="0"> <tr> <td>DEFECTS.</td> <td>1 TRIPLE VALVE.</td> <td>4 CYLINDER PACKING.</td> <td>11 BRAKE RIGGING.</td> </tr> <tr> <td>2 RESERVOIR.</td> <td>5 RELEASE COCK.</td> <td>6 RELEASE COCK.</td> <td>12 ODD BRAKE.</td> </tr> <tr> <td>3 CYLINDER.</td> <td>7 ANGLE COCK.</td> <td>8 CROSS-OVER PIPE.</td> <td>13</td> </tr> <tr> <td></td> <td>9 CROSS-OVER PIPE.</td> <td></td> <td></td> </tr> <tr> <td></td> <td>10 HOSE CONNECTION.</td> <td></td> <td></td> </tr> </table>				DEFECTS.	1 TRIPLE VALVE.	4 CYLINDER PACKING.	11 BRAKE RIGGING.	2 RESERVOIR.	5 RELEASE COCK.	6 RELEASE COCK.	12 ODD BRAKE.	3 CYLINDER.	7 ANGLE COCK.	8 CROSS-OVER PIPE.	13		9 CROSS-OVER PIPE.				10 HOSE CONNECTION.		
DEFECTS.	1 TRIPLE VALVE.	4 CYLINDER PACKING.	11 BRAKE RIGGING.																				
2 RESERVOIR.	5 RELEASE COCK.	6 RELEASE COCK.	12 ODD BRAKE.																				
3 CYLINDER.	7 ANGLE COCK.	8 CROSS-OVER PIPE.	13																				
	9 CROSS-OVER PIPE.																						
	10 HOSE CONNECTION.																						
By	Inspector. By	Conductor.																					

DIVISION.

THE L. S. & M. S. RAILWAY CO.

DEFECTIVE AIR-BRAKE CARD.

Applied to Car No. Initials

Date at

By Inspector.

By Cond'r. Train No.

Defects

USE FIGURES TO DESIGNATE DEFECTS.

The Lake Shore & Michigan Southern Railway Co.

DEFECTIVE AIR BRAKE.

CAR CANNOT BE PLACED BETWEEN AIR-BRAKE CARS.

Car No.	Initials	Date	Train No.																				
Card Applied at																							
<table border="0"> <tr> <td>DEFECTS.</td> <td>1 TRIPLE VALVE.</td> <td>6 RELEASE COCK.</td> <td>11 BRAKE RIGGING.</td> </tr> <tr> <td>2 RESERVOIR.</td> <td>3 CYLINDER.</td> <td>7 ANGLE COCK.</td> <td>12 ODD BRAKE.</td> </tr> <tr> <td>4 CYLINDER PACKING.</td> <td>5 CUT-OUT COCK.</td> <td>8 CROSS-OVER PIPE.</td> <td>13</td> </tr> <tr> <td></td> <td></td> <td>9 CROSS-OVER PIPE.</td> <td></td> </tr> <tr> <td></td> <td></td> <td>10 HOSE CONNECTION.</td> <td></td> </tr> </table>				DEFECTS.	1 TRIPLE VALVE.	6 RELEASE COCK.	11 BRAKE RIGGING.	2 RESERVOIR.	3 CYLINDER.	7 ANGLE COCK.	12 ODD BRAKE.	4 CYLINDER PACKING.	5 CUT-OUT COCK.	8 CROSS-OVER PIPE.	13			9 CROSS-OVER PIPE.				10 HOSE CONNECTION.	
DEFECTS.	1 TRIPLE VALVE.	6 RELEASE COCK.	11 BRAKE RIGGING.																				
2 RESERVOIR.	3 CYLINDER.	7 ANGLE COCK.	12 ODD BRAKE.																				
4 CYLINDER PACKING.	5 CUT-OUT COCK.	8 CROSS-OVER PIPE.	13																				
		9 CROSS-OVER PIPE.																					
		10 HOSE CONNECTION.																					
By	Inspector. By	Conductor.																					

DIVISION.

Page 400,
Sheet A.

31. Protection of Trainmen.

Page 402.

32. Platform Safety Chains.

Page 402,
Sheet A.

33. Marking Fast Freight Line Cars.

Page 403,
Sheet A.

34. Arch Bars and Column Bolt for 80,000-pound Capacity Car.

Page 403,
Sheet B.

35. Attachments of Couplers to Cars.

Page 403,
Sheet B.

36. Buffer Blocks with M. C. B. Couplers.

Inasmuch as the buffer blocks partially illustrated on Sheet B have been adopted as a standard, and are now shown on Sheet 11 in detail, committee would recommend that the reference to buffer blocks, in connection with Recommended Practice, on page 403, be eliminated.

Page 404,
Sheet B.

37. Uncoupling Arrangements for M. C. B. Couplers.

38. Journal Bearing and Wedge Gauges.

In order to make these details correspond strictly to the M. C. B. Standard shown on Sheets 3 and 6, committee would recommend that the radius and diameter, respectively, shown for the bearing bore gauge for $3\frac{3}{4}$ by 7 inch journals, be changed from $1\frac{1}{8}$ inches and $3\frac{3}{8}$ inches to $1\frac{3}{8}$ and $3\frac{1}{8}$, and the corresponding dimensions on the bearing bore gauge for $4\frac{1}{4}$ by 8 inch journals be changed from $2\frac{1}{8}$ inches and $4\frac{3}{8}$ inches, respectively, to $2\frac{5}{8}$ inches and $4\frac{1}{2}$ inches.

Page 405,
Sheet C.

39. Safety Chain for Freight Cars.

Page 405,
Sheet C.

40. Minimum Thickness for Steel Tires.

Page 405,
Sheet C.

41. Dummy Coupling Hook.

Inasmuch as the use of dummy coupling hook is generally discontinued, committee would recommend that this item be eliminated from the Recommended Practice.

Page 405,
Sheet E.

42. Mounting Wheels.

Page 406.

43. Adjusting Height of Drawbars.

Page 406.

44. Stenciling Cars.

Committee would recommend change in the wording of the text by omitting the words "Fox Trucks" and substituting the words "Pedestal Type of Trucks."

Committee would also recommend that the following note should be added to the last paragraph of this recommended practice :

"The initials of the road should also appear in letters not less than two inches high on one side of bolster or transom of each truck."

Page 407.

45. Air Brake Tests.

46. Loading Poles, Logs and Bark, on Cars.

In view of considerable correspondence received by the committee, recommending various changes in the Recommended Practice for loading, your committee cannot advise that the present Recommended Practice in this connection be adopted as a standard, and we feel that there are modifications in the present practice necessary to such an extent that it is desirable for the whole subject, together with the correspondence in the hands of the Committee on Standards, to be turned over to a special committee for action and report at the 1899 convention, and we would strongly recommend that such special committee be appointed for the purpose.

47. Box Car Side Door and End Door Fixtures.

Page 411,
Sheet F.

48. General Dimensions for Cars with Steel Underframing.

Page 411.

49. Air Brake and Signal Instructions.

Committee would call attention to the fact that a special committee on Air Brake and Signal Instructions, working jointly with a similar committee from the Master Mechanics' Association, is to report on the revision of these instructions. If the revision is accepted by the two Associations, your Committee on Standards would recommend that the revised Rules for Air Brake and Signal Instructions be adopted by the Master Car Builders' Association as a Recommended Practice.

Your committee would also recommend that a special committee be appointed to report at the 1899 convention on Specifications for M. C. B. Coupler Tests.

In conclusion, the committee would summarize its recommendations, and would suggest:

First: That the following recommendations be submitted to the Association for adoption by letter ballot:

1. Addition to note on Sheets 1 and 2, and on Sheets 4 and 5 to read, "Section of box may be made either circular or square below the center line, provided all the essential dimensions are adhered to."
2. Additional note on Sheets 2 and 5, reading: "When journal box is made of malleable iron, reduction in thickness of metal and coring to lighten weight is permissible, provided all the essential dimensions which affect interchangeability and the proper fitting of contained parts, are adhered to."
3. Reduction of clearance allowed on either side between central lug of brake shoe and adjacent lug to brake head from $\frac{1}{8}$ inch to $\frac{1}{16}$ inch.
4. On Sheet 9, diameter of release valve rod to be changed from $\frac{1}{4}$ inch to $\frac{3}{8}$ inch.
5. On Sheet 9, the diameter of truck lever connection for outside hung brakes to be changed from $\frac{3}{4}$ inch to $\frac{7}{8}$ inch, and note under title on sheet, and reading of text on page 387 to be changed accordingly.
6. On Sheet 9, diameter of hole for cotter in air-brake pin to be indicated as $1\frac{1}{8}$ inch.
7. On Sheet 9, addition to note under drawing of truck lever connection for inside hung brakes, as follows: "And if made of round iron or steel must not be less than $1\frac{1}{8}$ inches diameter."

8. On Sheet 9, omit dummy coupling from drawing and show air hose hanging down.

9. On Sheet 9, omit the words "33 inches or" from dimensions shown for height of air-brake pipe above rail.

10. Adoption of axle, journal box and details for cars of 80,000 pounds capacity as an M. C. B. Standard, instead of Recommended Practice.

11. Modification of form of air-brake card, as illustrated.

12. Elimination of reference to buffer blocks on page 403.

13. Change in dimensions for radius and diameter of bearing bore gauge, Sheet C, to correspond with dimensions shown in Standard Journal Bearings for $3\frac{3}{4}$ by 7 inch and $4\frac{1}{4}$ by 8 inch journals.

14. Elimination of dummy coupling hook from the Recommended Practice.

15. In instructions for stenciling cars substitution for words "Fox Trucks" of the words "Pedestal type of trucks."

16. Addition to last paragraph on stenciling cars of the following: "Initials of the road should also appear in letters not less than 2 inches high, on one side of bolster or transom of each truck."

17. Include revised Air Brake and Signal Instructions among Recommended Practice.

Second: That the following subjects be referred to special committees for investigation and report to the convention of 1899:

1. Improvement and perfection of standard top hinged lid, so that it may more completely exclude dust from the journal box.

2. To recommend forms of standard journal boxes for $3\frac{3}{4}$ by 7 inch and $4\frac{1}{4}$ by 8 inch journals, adapted for use with the pedestal type of freight car truck.

3. M. C. B. automatic couplers. To define length and spread of guard arm, and also consider the devising of a safety limit gauge for determining when M. B. C. couplers and knuckles are worn beyond the limit of safety.

4. To revise the Recommended Practice for loading poles, logs and bark on cars.

5. Specifications for M. C. B. coupler tests.

Respectfully submitted,

A. M. WAITT,
G. L. POTTER,
WILLIAM APPS,

Committee.

CLEVELAND, OHIO, May 25, 1898.

[Under the head of "4" on the last page, last line but one, Mr. Waitt added:]

In that connection I would say there should be added to the report a committee to act in connection with a similar committee appointed by the American Railway Association, who have requested that we appoint a committee to confer with them on that subject. At their recent meeting the American Railway Association discussed quite at length the subject of loading cars. It was decided not to take final action until after conference with a similar committee from this Association, hoping to put the matter in such shape that it could be generally adopted, and not only adopted in the two Associations, but put into practice. I would say, too, that the Committee on Standards has received a large number of communications in connection with this subject from various parts of the country, in connection with the various kinds of lading for cars—not only lumber, but structural material, rails, blocks of stone, etc.—and the communications were of such importance that the Committee on Standards did not feel that it was within its province to attempt to make any specific recommendations other than to recommend that the whole matter be referred to a proper committee to take action, to consider the recommended practice from all these points, and to consider the correspondence that our committee has to turn over to it; and the recommendation has since come from the American Railway Association that whatever committee is appointed should confer with a similar committee that it has appointed.

THE PRESIDENT: You have heard the report. What is your pleasure?

MR. RHODES: I would move that the report of the committee be received, and that we proceed to consider the two recommendations separately.

The motion was carried.

THE PRESIDENT: Consideration of the first recommendation, then, is now in order.

MR. CLOUD: The first is: That the following recommendations be submitted to the Association for adoption by letter ballot. Is it the purpose of Mr. Rhodes' motion to vote on these as one?

MR. RHODES: As a whole; yes.

MR. CLOUD: The first question will be whether or not these seventeen recommendations shall be submitted to letter ballot.

MR. HIGGINS : Is the report now before the convention for discussion ?

THE PRESIDENT : Yes, sir.

MR. HIGGINS : In regard to the card for defective air brake, I think it would be a good plan if some action could be taken to decide on what part of the car that card should be placed. As it is now, different roads attach that card to the car in different localities. In fact, on the same road different inspectors will not attach the card in the same place, and the same way with the trainmen. I think it would be well to consider that point.

THE PRESIDENT : Was that given any consideration, Mr. Waitt ?

MR. WAITT : No. That never has been included in the Standards. There never has been any recommendation made, and the committee did not make any mention of location.

MR. MACKENZIE : Why cannot the committee handle that ? It would be a matter of not very much labor to do it, and I think they could dispose of it very quickly. I believe it is of very great importance to the railroads that we should have some standard place to put these cards, so that anyone looking for an air-brake card would know where to look for it, just the same as he would for an M. C. B. defect card or repair card.

MR. SIMONS : For some time we have had the rule in practice to place an air-brake card on the side of the car above or below the car number, so that it can be seen by all parties ; and I think myself that is the proper location for it.

MR. SCHROYER : We have always understood that the use of these air-brake cards was to indicate to our car repairers the defect existing on the cars. We never put the card on as a guide for trainmen in handling that car, because we have enough repairers on the road to catch the car before it has gone a great distance, and it is our practice, in view of the fact that it is a guide for the repairers and inspectors in determining the location of the defect, to attach the card where the defect is located. If it is the triple valve, we tie the card on the triple valve ; if it is a train pipe, we tie it to the train pipe ; if it is a leaky hose, we attach it to the hose.

MR. MACKENZIE : While we have not gone into it very far yet, ninety-nine per cent of all the cards that are attached are attached by the trainmen, and they are taken off by the repairmen. Now, then, if we say to the trainmen, " Put that card in a certain place," the

inspector knows where to go for it every time, and we ought to do that.

THE PRESIDENT: Is there any further discussion?

MR. GARSTANG: I move that the Committee on Standards designate the place to locate the card. (Seconded.)

The motion was carried.

MR. RHODES: Mr. Chairman, I would move that recommendations 1 to 17, inclusive, be referred to letter ballot.

The motion was seconded by Mr. Hayward, and carried.

MR. RHODES: I move that the second recommendation of the committee, numbered from 1 to 5, be referred to the Committee on Subjects.

The motion was seconded by Mr. Schroyer, and carried.

THE PRESIDENT: We will now take up the report of the committee appointed to confer with the auditors, through Mr. J. S. Lentz, chairman.

Mr. Lentz read the following report:

REPORT OF COMMITTEE ON CONFERENCE WITH AUDITORS.

Your committee appointed to confer with a committee of the American Railway Accounting Officers' Association, with a view of recommending a plan for the simplifying of bills and accounts, met with a committee of that Association at Pittsburg, Pa., on January 27.

After a careful consideration of the subject, the following resolutions were unanimously agreed to:

1st. That all charges against any one railway company or individual car owner, as shown by the representation in the Master Car Builders' Association, must be consolidated into one monthly bill.

2d. That the standard forms for the rendering of bills under the Master Car Builders' Rules shall be as follows:

Form "A"—For repairs to cars.

Form "B"—For wheel and axle work.

Form "C"—For summary of bills.

3d. That no bill shall be returned for correction on account of error for less than \$1.00 in aggregate of bill, but said bill shall be passed for payment at once, and the alleged error brought to the attention of the road rendering the same within sixty days from date of bill. The receiving road shall at once issue authority for counter bill to cover the acknowledged error. If the alleged error is not conceded, the matter is to be promptly referred to the Arbitration Committee for decision.

4th. That the Executive Committee of the Master Car Builders' Association instruct the Secretary to obtain from each representative member of the

Master Car Builders' Association a classification of all cars the road which he represents owns or controls. That this list be printed and distributed in such manner as the Executive Committee may direct.

Your committee does not think it advisable to submit any recommendations in regard to depreciation of passenger equipment cars as between different railroad companies.

Your committee recommends that resolutions Nos. 1, 2 and 3 be incorporated in the M. C. B. Rules of Interchange, and the adoption by the Association of Resolution No. 4.

Respectfully submitted,

JNO. S. LENTZ,
W. W. ATTERBURY,
W. GARSTANG,
Committee.

SOUTH BETHLEHEM, PA., May 16, 1898.

COMPANY:

189

To
.....
COMPANY, Dr.

MAKE CHECK OR VOUCHER PAYABLE TO

All communications in regard to this bill should be addressed to

FOR REPAIRS TO CARS. AS PER M. C. B. RULES.

[illegible]

189

NAME CHECK OR VOUCHER PAYABLE TO

COMPANY, Dr.

All communications in regard to this bill should be addressed to...

For Wheels and Axles put under...

Cars.

Month of ---

[illegible]

Form C.

IN REMITTING PLEASE
QUOTE THIS NUMBER,

COMPANY.

189

MAKE CHECK OR VOUCHER PAYABLE TO

To

COMPANY, Dr.

All communications in regard to this bill should be addressed to

FOR REPAIRS TO CARS, AS PER M. C. B. RULES.

For repairs to cars as per detailed bills attached :—

THE PRESIDENT : Gentlemen, you have heard the report. What is your pleasure ?

MR. MITCHELL : I move that the report be received and that each item be considered by itself.

MR. CLOUD : The Arbitration Committee is going to meet this afternoon, as per notice which was given here a little while ago, and it is a question whether it would not be well to have that committee consider this report. I believe it was called at this time with the idea that that would be a good way to dispose of it at present.

MR. ATTERBURY : I move that this report be referred to the conference meeting of the Arbitration Committee this afternoon, and be brought up again tomorrow morning.

The motion was carried.

THE PRESIDENT : I will call for the report on Triple Valve Tests, G. W. Rhodes, chairman.

MR. RHODES : Mr. Chairman, the Committee on Triple Valve Tests has not prepared any written report. Our verbal report is that we have not been called upon to make any investigation of triple valves during the past year. The committee has viewed this indifference of railroad managers and railroad men with, I might say, almost dismay. We have reached practically the same condition that we were in prior to the brake tests inaugurated by this Association in 1886. At that time we had no specifications and no requirements for power brakes. When this Association's committee commenced its work, rather to the astonishment of the whole country, it was discovered that there was not a brake that was in existence at that time that was suitable for long freight trains. A great deal of money was being spent on certain devices, which the committee proved beyond any question unsuitable for long freight trains at high speed. They answered well enough on short four-or-five-car trains at slow speeds, but were impracticable at the speeds which your committee found it advisable to make tests at. Now, what is the condition today? Are we not taking just precisely the same action that we took prior to 1886? Are not brakes being introduced today that have not been subjected to the prescribed test? And is it a wise thing for this Association, in view of its past efforts, to let that thing go on? That is the way the committee feels, and in consultation with my associates we considered whether we would not ask to be relieved from our responsi-

bilities, and to have no committee, rather than to have a committee which is merely a figurehead. In consulting with a number of railroad men they thought that it would not be wise for the committee to take that action, and if this feature of the railroads was so important that the railroads would get out of that indifference; and with that view our committee is not going to ask to be discharged, but we do hope that some steps will be taken to see that air-brake devices reach a certain stage of efficiency before they get on to the freight cars and trains of the railroads throughout this country. This thing is going to become more and more important. As the various patented devices expire there will be greater and greater demand to get more of these devices into service, and it is going to be very essential for the welfare of the railroads in this country that they have a measure of standards. We have got it in our rules now, and there is no reason why we should not know that all triple valves meet these requirements. [Applause.]

MR. WAITT: I wish to heartily indorse the sentiments that have been brought out by Mr. Rhodes in connection with triple valves and triple-valve tests, and the relation of the Master Car Builders' Association to the results of such tests. We are being compelled on lines of safety to equip our cars with automatic brakes. It is necessary that these automatic brakes should work in harmony. Whatever the device may be in the line of triple valve that is applied, it must work in harmony with the other triple valves on the train. We have a committee which is able and willing to make tests and report results, and we have facilities for testing these triple valves. We have adopted certain rules and requirements in connection with what a triple valve must do. They have all been worked out in the line of safety; in the line of real necessity for good service. It seems to me that it is full time for our Association to take up the results of the tests that this committee has made, and to put ourselves on record as considering that the best practice would be for all railroads to accept and use only such triple valves as have been passed and found to be satisfactory, under our rules, by the committee on tests; and I think it would be well if we could have in our printed proceedings, among perhaps the recommended practice, a list of the triple valves that have passed the test, named specifically by catalogue number and by maker's name, so that they would be known as accepted and approved triple valves for use on the railroads represented by this Association. I think the moral effect of that would go far toward preventing the adoption of the

cheapest thing that can be bought when new cars are being purchased, or cars are being equipped for the first time with air brakes ; and I surely hope that some action of that kind will be taken, and I will indorse any motion that is made to that effect.

MR. MITCHELL: The Federal law tells us that by January 1, 1900, we must have air brakes on our cars so that they will work and readily interchange one with another. That law goes into effect, as I said, January 1, 1900 ; therefore, the Rules of Interchange, as revised in 1899, will have to contain some provision for changing, at the car owner's expense, such brakes as do not work harmoniously with the majority as required by the law. I therefore make a motion that the Standing Committee on Triple Valves this year obtain triple valves from the manufacturers and make tests of them and report the results of its tests to this convention next year, giving specific names and referring to catalogue numbers, so that we will know exactly what triples will work in accordance with our requirements and what triples will not, and that will give us the information we will require next year in order to make the Rules of Interchange explicit. (Seconded.)

MR. LEEDS: Mr. President, before that motion is put I would say that I was in hopes that this matter would be allowed to run until next year ; next year it has got to be finally settled. During that year the efficiency or inefficiency of other devices will be pretty well developed and demonstrated. I believe that there are requirements in our triple valve tests that are not essential. I find by investigation that a great many are interchangeable, and they interchange with cars that they claim will not work in harmony. If that is the case it will practically demonstrate itself in the coming year whether these devices are efficient or inefficient. We already have in our rules a rule that a car shall not be considered an air-brake car unless the triple has been presented to and passed upon by our committee. I do not see what further you want than that. In fact, if that rule stands and is not abrogated the coming year, it does exclude many of the devices that are being offered ; and at the same time, in the coming year it can be very well demonstrated whether there is anything that is not essential contained in our present triple valve test. Our triple valve test of the present time is based upon the greatest refinement that has ever been obtained in a triple valve. The question arises whether all those refinements are essential, and are they any more essential on a freight train than they are on your palace-car trains, where you have not got them ?

MR. JOHNSON : I concur in the remarks of Mr. Waitt and Mr. Rhodes in reference to the requirements of air brakes and triple valves. The roads have been very dilatory in sending triples to have them tested. Now, sir, as the gentleman on my left said, it would be necessary to have tests made by the Association. This I heartily concur in. I think it is foolish to procrastinate in anything that is so important as air brakes. If we leave it we simply await the time when we reach the precipice and are pushed over. The point we have before us is well illustrated by Mr. Rhodes. The market today is being glutted with different appliances to answer this one purpose. There is no law which prevents that, and there is nothing that compels, as I heard today, our committee to take those triples, test them and make a free report. As I understand it, the committee is supposed to wait until this material is submitted to them before they can make a proper report or even a test. I believe, sir, that the time has come when prompt action on the part of this Association, not only with triple valves but many other things, should be taken ; and I like to see the soldier that faces the music and does not wait for the enemy at a distance, but is ready to work when the time comes.

THE PRESIDENT : Is there any further discussion before this motion is put? The motion is that the committee make tests of triple valves, all that are presented — all triple valves in use — and report all those standing the test. Is that it?

MR. MITCHELL : All those that stand the test and all those that do not stand the test. We want to know where we stand. That is all. If there are half a dozen triples in the market and there are three we can use and three that we cannot use, we want to know what they are.

MR. HUMPHREY : It seems to me we are going to lose a great deal of valuable time, and I would like to ask if this report could not be made to the Executive Committee of this Association soon, so that the report could be in the hands of each member of this Association before the next meeting. In this way the owners of the different devices would understand that they would have to present to the Committee on Triple Valves their devices for a test, and then the test could be made and the report sent out ; and if the tests were not made I think it would be indicative of the fact that their triples would not come up to the standard, and the members of this Association then would know whether to specify or use any of those triple valves that had not answered the requirement. If it is in order I would make an amendment to the motion which is now before the house : That

this report be made and submitted to the Executive Committee as soon as practicable, to be printed and circulated among the members.

The motion was seconded by Mr. Johnson, and carried.

THE PRESIDENT: Now, the question before the house is the motion as amended. Will you state the motion, Mr. Cloud?

MR. CLOUD: As I have the motion it is, that the Standing Committee on Triple Valve Tests make tests of all triple valves now on the market as soon as practicable, and report the names of those which pass the test, and those which do not; that this report be made to the Executive Committee, which shall consider it and publish the information to the members during the year, or as soon as ready.

The motion was carried.

THE PRESIDENT: The next order of business is No. 12 — Discussion of Questions Propounded by Members.

MR. MITCHELL: Mr. President, the noon hour is here now.

THE PRESIDENT: That is what we are getting at, Mr. Mitchell. It is customary to limit the discussion to ten minutes. The first topic: "*Lumber Specifications for Freight Cars* :

"(a) *Standard sizes for longitudinal sills for box, stock, long gondola, and hopper gondola cars.*

"(b) *Standard width of siding and roofing for box cars.*

"(c) *The best substitute for white pine for freight car siding.*"

Discussion to be opened by Mr. P. Leeds.

MR. CLOUD: Mr. Leeds has had some matter printed on this subject since the reports were distributed to members, so that we are able now to distribute copies.

MR. JOHNSON: I would make a suggestion now, that the chairmen of the different committees in addressing the house would do so from the stage. They can do it so much better.

THE PRESIDENT: On that suggestion, Mr. Leeds, will you step up to the platform?

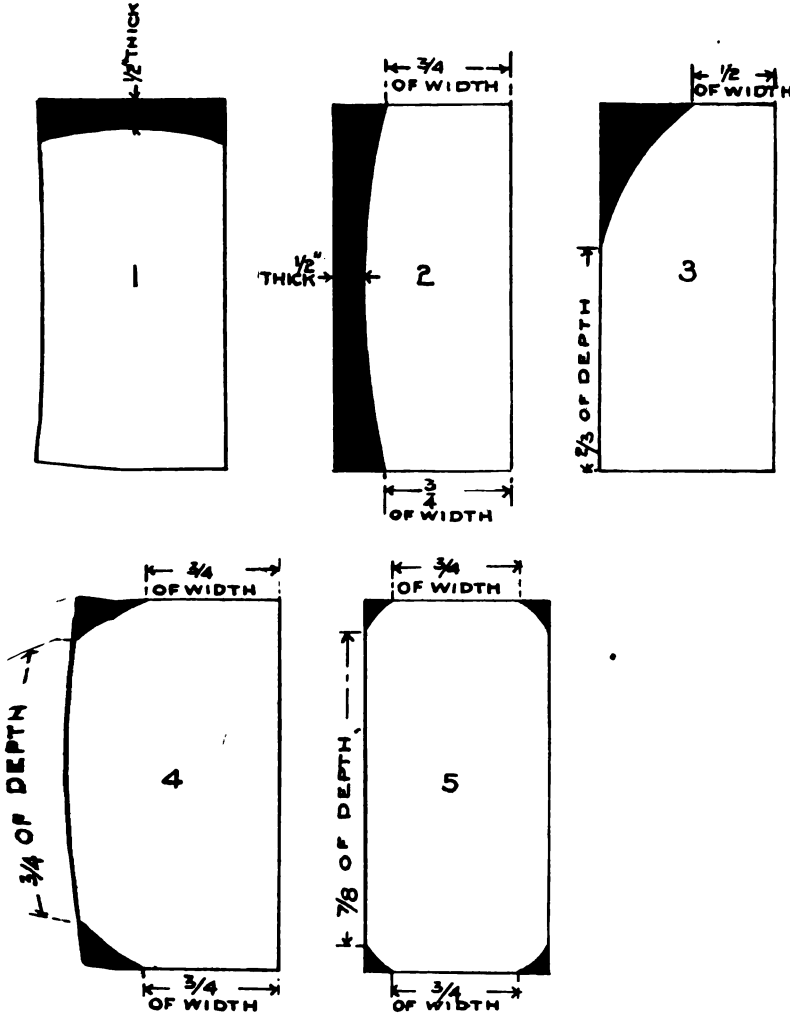
MR. LEEDS: I thought it best to have this printed in this manner, from the fact that I would like to have the specifications torn to pieces, and one can do that better by having them printed and not depending upon memory.

Mr. Leeds then read the following discussion :

TOPICAL DISCUSSION OF MR. P. LEEDS ON LUMBER SPECIFICATIONS FOR FREIGHT CARS.

Gentlemen of the Master Car Builders' Association :

Having been delegated to make some suggestions relative to the subject of lumber specifications for freight cars, I note that the committee indicates that this should be confined to dimensions, but, in my opinion, it would be fully as essential that the quality should be specified first, and have taken the liberty to outline what, in my opinion, would enable us to obtain a class of lumber suitable for our needs, without



working a hardship upon the mill men or increasing the price on account of unnecessary requirements. With such specifications, which give the poorest grade that would be accepted, there should not be any question between mill men and inspectors.

RULES FOR INSPECTION OF LUMBER FOR MECHANICAL DEPARTMENT.

All lumber must be manufactured from sound, growing timber, true to dimensions, straight grained, and free from bark edge, splits, shakes, rot, worm holes, loose or rotten knots, or sound knots above the dimensions given, or so located as to materially impair the strength or durability of the piece.

In framing material, where the cross-section is 4 by 8 inches and upward, sound knots $1\frac{1}{2}$ inches in diameter will be allowed, if not less than three feet apart and not less than one-fourth the width of the piece from the edge. Pieces which contain the heart center must be cut so the center of heart will be not less than two inches from either side or edge. Pieces which do not contain the center heart, as above, shall not be sawed less than one inch on side or edge, or two inches on corner from center. Bright sap will be allowed to the extent of $\frac{1}{2}$ inch, measured at its least depth (see Figs. 1 and 2), provided that when on the side of a piece the poorest edge shall show three-quarters of thickness sound heart (Fig. 2); when sap is on one corner of a piece it must show two-thirds the depth and one-half the thickness of good heart timber (Fig. 3); when on two corners it must show sound heart three-quarters of width and depth, respectively, on poorest edge and sap side (Fig. 4); when it shows on four corners the edges must show three-quarters, and the sides seven-eighths of heart timber (Fig. 5).

In smaller dimensions the knots and all other defects must decrease in proportion.

All main sills, side plates, side boards, running boards, ridgepoles, purlines and pine flooring, when of long leaf yellow pine, must be cut in the States of Georgia, Florida, Mississippi or Alabama.

Side boards, flooring, running boards, ridgepoles, purlines, etc., must have one entire heart face, and not less than three-quarters the width on opposite side, with one-half the thickness on both edges heart.

Siding and lining for freight cars should be ordered in 1 by 4 inch strips, or proper widths to make them, and such strips should have one clear heart face; bright sap on opposite side, and two sound knots $\frac{3}{4}$ inch diameter to each strip of eight feet in length, will be accepted. When ordered in wide boards the inspection will be in accordance with this. This lumber must be free from pitch streaks and pockets.

For Winslow roofing in strips of 6 inches wide, bright sap to the extent of one-third the width, and two sound knots $\frac{3}{4}$ inch diameter in a piece five feet long, will be admissible, if not near the edge.

For double board roofing, one face must be clear heart and free from knots, opposite side and edges not less than one-half heart.

Stock boards ten inches and over will be accepted with perfectly sound knots of 2 inches diameter, if fairly intergrown to prevent falling out, to the extent of three in a length of twelve feet, if not located near the edge. Sap should not exceed one-third width of board on either side.

Common boards can be all bright sap if clear from knots, or one-half sap with sound knots, as in stock boards.

On orders for oak, nothing but White or Burr oak will be accepted.

Blue sap will not be accepted in anything, but in common boards a slight stain will be admissible.

As these rules are descriptive of the poorest quality that will be accepted, it is expected that at least seventy-five per cent of each shipment will be of a superior quality, and in making report of inspection to purchasing agent on Form 261, the number of pieces coming under different classifications will be reported, or in case of boards, the percentage of the carload.

In making requisitions, and reporting on Form 261, the different grades needed, and received, will be indicated by numbers as follows :

No. 1. To be clear heart throughout and contain no center heart. This grade to be used for pattern-making, fine cabinetwork, pilots, passenger car siding, platform and truck timbers for passenger equipment only.

No. 2. To have three corners free from sap and contain no center heart. To be used for brake beams, draft timbers, body bolsters, passenger car framing, etc.

No. 3. To be in accordance with general description and cuts for framing material. For general use.

No. 4. To be as per general description for SIDE BOARDS, FLOORING, ETC.

No. 5. To be as per general description for SIDING AND LINING.

No. 6. To be as per general description for WINSLOW ROOFS.

No. 7. To be as per general description for DOUBLE BOARD ROOFS.

No. 8. To be as per general description for STOCK BOARDS.

No. 9. To be as per general description for COMMON BOARDS.

As these rules apply to all kinds of wood, requisitions and orders should be made out, giving quantity, kind of wood, dimensions, for what use, and then designate the grade or quality by number, care being taken not to designate a superior quality to what is really needed, as it is but reasonable to expect that prices will be governed by the grading.

As to the dimensions called for under paragraph "a." In my opinion one size of sill is proper for any of this class of car, and as a 4 by 10 will give all the strength necessary for compression and for carrying between bearings, the principal point is to guard against the tendency to break over the transoms. On this account I would recommend greater thickness in preference to depth, on account of the removal of valuable material by the vertical bolts, a 5 by 10 with a three-quarter bolt hole through it being less liable to break at this point than a 4 by 12 with the same sized hole through it; and as all of our carrying capacity is practically dependent upon the trussing, I consider these sizes sufficient for any class of car.

As regards paragraph "b." In my opinion all siding and lining should be $3\frac{1}{4}$ inches face, as this can be got out from the commercial widths of four inches, and will give no trouble by shrinkage, and further is capable of being securely fastened with a reasonable number of nails. The making of siding and lining uniform enables us to use our material to better advantage — the best for siding, and inferior grade for lining. Roofing is, in my opinion, most economically worked and laid from 6-inch strips, giving a face of $5\frac{1}{4}$ inches, two nails to a crossing.

Paragraph "c." In my opinion first-class yellow poplar is not only the best substitute for white pine, but fully equal, as there is nothing, so far as my observation goes, that will hold paint as well, and it also holds the nail fairly well. Many of us

have to use hard pine on account of excessive cost of white pine or yellow poplar, but it is not a good substitute, where they can be obtained at a reasonable advance in cost. The argument advanced in favor of steel versus cast iron, etc., of dead weight, will apply fully to this matter of siding, and I know of nothing that is a substitute for white pine or yellow poplar where they can be obtained at a reasonable cost.

I hope there will be a discussion of the subject of standard dimensions not only as advanced, but the desirability of standard dimensions for all material constituting the framing of a car. If we could get widths and thickness uniform, the length would not be so essential, although desirable. In my opinion, all cars of certain classes should be uniformly framed; not only would we get the benefit in repairs of foreign cars without delay, but when specifications were issued (as they frequently are) calling for all lumber and timber to be seasoned on the stick for at least six months, although calling for a delivery within sixty days, they will not be so apt to call up a derisive smile, inasmuch as manufacturers could then not only stock up for seasoning and take advantage of the market, but they could well afford to build such standard cars in stock, and when offered a contract in which the delivery was the essence of such contract, would only have to letter well-seasoned cars, instead of having to pick the buds and leaves off such "seasoned" timber as will persist in growing while in process of construction into cars for prompt delivery.

P. LEEDS.

THE PRESIDENT: There is five minutes more time for this subject, if any gentleman has anything further to say.

MR. HAYWARD: Mr. Chairman, I hope there will be a free discussion, particularly of the last paragraph, on the standard dimensions of cars. As the freight car today is interchangeable all over the country, it no longer is a question as to how we will build our cars altogether from our own standpoint. We have got to consider the particular question of interchangeability. It is quite as important for any one road in the country to have cars of uniform strength and uniform size of material for repairs, as it is for any one road to consider it in regard to their own equipment; and that is one of the great troubles we are having in the interchangeability of cars, namely, the fact that the materials differ sometimes but slightly, and consequently we use the material we have so close to the size that the difference is scarcely apparent. We find that a car after having, as we consider, been well repaired and very close to the standard of the company in sizes, will be rejected for wrong material, although practically the material is the same in every respect. Then, again, a great many roads have their standard material on hand, and they have to cut that down to suit at a loss, or else carry odd sizes, and I think that this subject is one that admits of a very wide discussion among the members, and I would be glad to hear from somebody on it.

MR. HIGGINS : I note that Mr. Leeds has only suggested one substitute for white pine siding and lining, and I wish to say a word in favor of Norway pine siding and lining. The road I am with has used Norway pine siding and lining for many years on all of its box cars with very good results. It may seem strange, but it is a fact, that the Norway pine we get holds the paint well, and the same is true with the nails, and by the use of Norway pine we are saving considerable money on cars. We specify Norway pine for new cars, and we use it in the repair of old cars.

MR. LEEDS : I would like to ask the gentleman if the Norway pine is not considered as of the white-pine family? If not, I beg to correct myself, inasmuch as I did not exclude the Norway or intend to—merely taking that as one of the white-pine family and I included it as such. I have no fight against the Norway pine.

MR. HENNESSEY : The Chicago, Milwaukee & St. Paul road has been using a siding and roofing since 1890 which we think equals or excels the average grade of pine that is in the market today for siding or roofing ; and that is what is termed “ Douglas Fir ” or “ Oregon Fir ”; some call it “ Washington Fir.” We buy it sawed vertical grain. If it is sawed that way we get no scales on it, which Norway pine is subject to. It holds the paint well, and for lasting qualities I think it is equal to any pine in the market, if not better.

A MEMBER : How about shrinking?

MR. HENNESSEY : I do not think that the shrinkage is any greater than it is with pine if properly dried.

MR. APPLEYARD : I would like to indorse what Mr. Hennessey says in regard to the Oregon fir. We have used a considerable amount of that in our freight cars and for passenger-car floors, and we find it gives excellent results both as to wearing qualities and strength. The lumber is lighter than pine and works exceedingly well, and I think that some specification as to the kind of lumber which can be substituted for white pine in the repairs to foreign cars should be made by the Association. A case in point is this: about a month ago we made repairs to a fast line refrigerator car, replacing some broken sheathing on the end, in which we used the Oregon fir—not having the white pine sheathing—supposing it to be fully as good as the white pine. The car went home with our repair card upon it, and in the course of time a bill was made against us with a joint-

evidence card saying that we had used yellow pine sheathing in place of white pine, and that they wanted to be reimbursed for it. Now, I think that it is simply ridiculous that we should be charged for using wrong lumber in a case of that kind.

MR. SMALL: I want to mention a similar case, and to refer to California redwood for siding and roofing. We had occasion to repair a foreign car and used redwood; in the course of time we received a bill. They had billed some other material—I suppose standard for that road. Now, redwood is the most durable wood, I presume, that there is in the country. We should feel very sad, indeed, if we should have to do without it. A great many members are not familiar, probably, with redwood. I trust if they find it on any of their cars they will not send us a bill for wrong material.

MR. CHARPIOT: From what has been said I think it would be a very good plan hereafter whenever we build a car to put on the sides, "This is Oregon Fir," "This is Yellow Pine," "This is Norway Pine," or "This is Southern Pine," or "Long-Leaf Pine," or we can even go so far as to give the botanical name, in order that there shall be no mistake about it. [Laughter.] Why is it that we cannot agree on accepting certain physical tests which we all acknowledge to be satisfactory, and agree in accepting anything that will meet these tests? There has been a great deal said about yellow pine. Well, I have used yellow pine for sixteen years in the South for all purposes in building rolling stock, and I do not see that we have any trouble with it in any way, and if anyone ever has I would like to know what the character of the trouble is, except so far that it did not particularly fit the kind of material they used heretofore and considered the thing they ought to have. I think that if this Association wants to put itself on record as a utilitarian body, it would be well to adopt rules in regard to this thing that would make it easier for everybody to maintain rolling stock and to keep it in service, which is the main use of rolling stock—instead of the inspectors wasting time finding out the quality of the material of which it is made.

THE PRESIDENT: The time has been already exhausted, and unless there is a motion to continue the subject we will pass to the next, which is No. 2, entitled: "*The present Master Car Builders' Journal Boxes, Stop Wedges, Brasses and Lids* :

"(a) *It is claimed that the present shape of top of wedge is a source of danger by throwing center of load outside or inside of center*

of journal, thereby concentrating load on one end or the other, instead of distributing it equally.

"(b) A consideration of the general form of box and the present lid, which has not been entirely successful as a dust-proof covering.

"(c) Limiting thickness of journal bearings when worn out."

I do not see any person named here for opening the discussion.

MR. CLOUD : I see some gentlemen are going out, and would like to say there is no roll call today, and any members who wish to be recorded as present should leave a card in the box at the door.

Mr. Ball read the following discussion :

The top surface of the present M. C. B. key is in the shape of cylindrical segment, the radius of the curve being 78 inches. When the journal box is in its normal position, it is in contact with the key at its center, and load which it supports is distributed uniformly lengthwise of the journal. Any necessary adjustment between the box, key and brass by reason of truck imperfections is obtained by a rocking motion of the box on top of the key. It follows that an adjustment obtained in this way necessarily implies an eccentricity of bearing between the box and key, resulting in increasing the unit pressure at one end of the journal, and to such an extent at times as to seriously interfere with proper lubrication.

In the examination of trucks that have been in service for some time it will be noticed that a large percentage of the boxes are inclined out of the vertical. In most cases it will be found that the tendency of box is to incline outwardly at the bottom, throwing the load toward the rear of the journal.

In pedestal type of trucks this condition is very noticeable from the excessive wear which takes place between the pedestals and box guides at top of box. A further evidence of the want of uniformity in the distribution of the load is seen in the unevenly worn bearings which are removed from time to time. It is well known that the rear end of the journal is the most difficult part of the journal to keep properly lubricated, owing to the tendency of the packing to shift out of position, and also to the amount of grit and sand that is carried in through the rear of the box.

Add to these obstacles to proper lubrication the excessive bearing pressure at the rear end of brass, and we have a combination at work that sooner or later gives the inspector an opportunity to send in a report of a hot box, resulting from a "doubtful" cause.

What is desired is a key or brass that will adjust itself to the inequalities of the truck, and at the same time maintain a uniform distribution of the load lengthwise of journal. This condition cannot be obtained with the use of the present M. C. B. standard key.

THE PRESIDENT : Is there any further discussion ? If not, we will proceed to the next, which is No. 3 : "*Limit Gauges for Safe Allowable Wear in Master Car Builders' Coupler.*"

MR. WAITT : I would like to suggest that the discussion of that subject be taken up in connection with No. 13, that is, in connection

with the M. C. B. coupler, and the security in connection with trains breaking in two. I see my name is down to open that discussion. As this matter of Limit Gauges for Safe Allowable Wear is one of the principal points I have in mind, I would like to see it deferred until then.

THE PRESIDENT: We will pass No. 3, then, and take up No. 4: "*A Consideration of the Best Arrangement of Air-Testing Plant for Large Terminal Points.*" Discussion to be opened by H. F. Ball.

Mr. Ball read the following discussion:

A CONSIDERATION OF THE BEST ARRANGEMENT OF AIR-BRAKE TESTING PLANT FOR LARGE TERMINAL POINTS.

The subject of air-brake testing plants at terminal points is one of great moment to car department men, involving, as it does, the proper maintenance of one of the most important features of the present-day freight equipment car.

At the eastern terminus of the L. S. & M. S. R'y an air-brake testing plant, suitable for taking care of a large number of cars, which it is intended the yard will handle, was recently installed. A brief description of this plant follows:

Air is furnished by a duplex compressor having 8 by 8 inch steam cylinders, and 14¼ by 8 inch and 9 by 8 inch air cylinders. Air is compressed into a storage tank of 100 cubic feet capacity, located in the open air and within thirty feet of the compressor. A 2-inch main feed pipe conveys the air from top of storage tank to a point opposite the repair yard, from which point branch feed pipes 1½ inches in diameter convey the air to the branch lines on the repair and inspection tracks.

Four branch lines of 1¼-inch pipe, having connections spaced fifty feet apart, complete the equipment for six repair tracks. The branch lines are located midway between the tracks, pipes and connections being secured in place on top of the planking.

In the inspection yard fourteen inspection tracks are taken care of by seven branch lines of 1¼-inch pipe. Each line of pipe furnishes air for two tracks; it is laid on top of ties, as close to the rail as practicable, and is held in place by ¾-inch wrought staples driven into the ties. Connections, consisting of 1-inch Westinghouse couplings threaded at one end and screwed into 1-inch cut-out cocks, and connected to tees in line pipe by 2¼-inch nipples, are located at distances of 100 feet apart. Each connection is inclosed in a box-shaped casting, the top and end of which are hinged and pivoted, forming a lid. The box is secured to the tie by screws. On each side of the box a wooden fender, of wedge shape, is provided for the safety of switchmen and others working in the yard. These fenders are of oak and securely nailed to the ties on which they rest. Cut herewith of "Track Connection Box" illustrates the construction.

An expansion arrangement is provided every 300 feet. This consists of two short sections of 1¼-inch air-brake hose connected together at one end by hose nipples, elbows and a union, and the opposite ends connected with the line pipe by hose

nipples and elbows, the whole forming a U-bend in the line. The expansion arrangements are inclosed in a manner similar to the hose connections.

All pipe used in the plant is extra heavy galvanized pipe.

At the junction of the branch feed pipes with the branch lines on the inspection and repair tracks, valves are provided, so that in case of necessity any one of the branch lines may be cut out and not interfere with the working of the remainder of the plant.

The location of pipe on top of ties close to rail, and the detail arrangement of hose connections above described would seem to commend themselves from the standpoint of economy in cost of installation, also in cost of maintenance. No trouble can be experienced with water lying in box and freezing, it being drained off as rapidly as it enters the box. The length of connection box being not over eighteen inches from rail, and having tapered fenders on each side, presents very little obstruction for switchmen to stumble over. In the event of repairs to track the work can be done without interfering to any extent with the pipe line.

In the plant above described we have about 23,000 feet of pipe, the storage capacity of which represents, approximately, 2,700 cubic feet.

The inspection tracks are provided with 206 connections. A plant of the above description, with connections, boxes, etc., located as described, can be installed for about 15 cents per running foot. This is exclusive of compressor and storage tanks.

THE PRESIDENT: Is there any further discussion on this subject? If not, we will proceed to the next.

MR. BUSH: I hardly think it is quite fair to let that question pass by without some further discussion. As a matter of general interest in connection with this, I would state that I recently made some investigation covering the present condition of air brakes which bears indirectly on this question. It shows the necessity of something comprehensive at large terminals for taking care of air-brake cars. What I wanted to say was this: That, taking a lot of cars promiscuously, over fifty per cent of the air brakes were in such a deplorable condition, owing to lack of care, that a service application could not be obtained at all, except with the maximum reduction that is necessary for that, and in a great many cases service application could not be obtained at all, nor the emergency application, and I think we are all equipping cars so generally with air brakes now, that something comprehensive, something systematic, is called for.

MR. HATSWELL: The matter of testing air brakes, as Mr. Ball has said, is an important one, but I would ask whether he intends a plant of this kind to be exclusively for the testing of air brakes. I would say that we have an air plant of this description. We have three compressors in different shops and we use the air at 100 pounds

pressure for all purposes about the shops, such as hoisting, etc., and where we have our connections for testing air brakes, we put on a reducing valve to bring the pressure down from 100 pounds to that of the air-brake service.

THE PRESIDENT: Is there any further discussion on this subject? If not, we will proceed to the next, which is No. 5.

"Standard Truck for 60,000-pound capacity cars ;

" " " 80,000 " " "

" " " 100,000 " " "

"(a) To consider the advisability of the Master Car Builders' Association adopting standard trucks for cars of these capacities, or the possible adoption of standard parts, with a view to decreasing the number of varieties of parts now used.

"(b) The relative efficiency of metal trucks of various forms as compared with each other and with the Diamond truck, comprehending the cost of maintenance, the effect on wheels and journals, and as regards safety.

"(c) The results obtained by the use of metal body bolsters.

"(d) A design for the best and most economical truck bolster for Diamond trucks, with a consideration of the best material for this purpose.

"(e) Has the pressed steel truck demonstrated the fact that it is superior to the Diamond truck and can be maintained more cheaply than the latter with arch bars 1¼ by 4 inches under 60,000-pound capacity cars."

The discussion is to be opened by Mr. E. D. Bronner.

Mr. Bronner read the following discussion :

Topic No. 5 is rather a broad question to handle on short notice and in a limited time. On account of the short notice I was unable to secure definite statistics and statements of experience from the membership, and will, therefore, be obliged to rely on my own experience and what few statistics I had on hand. Many of our members have had large experience with metal trucks of various forms, and will undoubtedly be able to add to the interest and value of the discussion.

"(a) To consider the advisability of the Master Car Builders' Association adopting standard trucks for cars of these capacities, or the possible adoption of standard parts, with a view to decreasing the number of varieties of parts now used."

As long as I can remember anything of Association affairs, the question of standard trucks has periodically been a subject for committee work and discussion. I remember fifteen years back, when I was in the drafting office, that I put in consider-

able time working on drawings for my chief, who was on such a committee. Coming down to more modern times, we find an able report to the Association in 1893. Their recommendations were:

"1. Uniformity in dimensions (except length) of materials used in arch bars and tie bars. Transom and bolster truss rods, oil box and column bolts; side bearings and center-plate bolts; spring steel used in elliptic springs; iron and steel transoms.

"2. Truck bolsters made and designed with a sufficient factor of safety to carry the marked capacity of the car without deflection enough to disturb free action of the side bearings.

"3. That many of the trucks need to be redesigned with a view of diminishing the number of parts fully twenty-five per cent, thereby reducing first cost and maintenance."

The strong tendency at the present time seems to bear out their opinion of the requirements as expressed in recommendation No. 2.

The wisdom of recommendation No. 3 cannot be disputed, and it also appears to be bearing fruit. In 1894 we had another report; in its summary the committee states: "It considers it useless to recommend special designs for arch bars as it would not be approved by the Association, as there seems to be no uniformity in this particular. For the same reason it did not consider it advisable to make recommendations for standard channel transoms." As a result of the report, the following recommendations were submitted to letter ballot as recommended practice:

Upper arch bar, 60,000 trucks.....	1 $\frac{1}{4}$ by 4 inches
Lower arch bar, 60,000 trucks.....	1 " 4 "
Tie bar.....	$\frac{3}{8}$ " 4 "
Wheel base.....	5 feet 2 inches

These were rejected by the Association.

In 1897 we had another truck report. The committee showed by diagram the great variation in set of arch bars, etc., in the 60,000-pound trucks in use, and came to the conclusion that it would be impossible to recommend a standard design. As a result of the committee's work, however, a design for arch bars for 80,000-pound cars was adopted by the Association as recommended practice, showing:

Top arch bar.....	1 $\frac{1}{2}$ by 4 $\frac{1}{2}$ inches
Lower arch bar.....	1 $\frac{3}{8}$ " 4 $\frac{1}{2}$ "
Tie bar.....	$\frac{5}{8}$ " 4 $\frac{1}{2}$ "
Wheel base.....	5 feet 2 "
Column bolt.....	1 $\frac{1}{8}$ inches diameter

Why was it that the design for 60,000-pound arch bars, submitted in 1894, was rejected and the design for 80,000-pound arch bars, submitted in 1897, was adopted, the former being apparently just as good a design for the purpose as the latter?

In the case of the 80,000-pound arch bar, we took time by the forelock. There were very few 80,000-pound trucks in existence, and nobody was prejudiced in favor of his own design. In the case of the 60,000-pound bars, there were many designs used very extensively, and it was impossible to reach a compromise. Everybody wanted his own design or nothing.

The lesson to be learned is that the easiest time to adopt designs is a little in

advance of the times. I refer, of course, to mere enlargements of well-known practice, and not to entirely new ideas.

Standard trucks for freight cars of 60,000, 80,000 and 100,000 pounds capacity has an alluring sound. In thinking the matter over, the question arises : Would it be possible to adopt them ; would it be the best thing for the future ; practically, what would it amount to ?

1. Judging from past experience, I should say that we cannot agree on a standard, and even if we were to adopt a recommended practice, it would not be largely used.

2. A standard adopted and fully recognized would impede progress.

3. It would amount to very little in the end, as the practical results sought could be largely accomplished by the adoption of standard parts.

To determine what the parts are that fail largely, I have analyzed the truck repairs on our road for one month. These are the running repairs made at outside repair stations, and do not include heavy repairs at shops.

The total number of cars receiving repairs, any kind, 9,864.

The truck repairs were divided as follows :

	Total Cars.
Wheels and axles (including journal bearings in a majority of cases).....	825
Journal bearings only.....	988
Journal bearing wedge.....wrought iron	57
Journal box bolts (about 72 per cent alone).....	317
Truck column bolts.....	173
Truck column guide bolts.....	163
Arch bars.....	86
Tie bars.....	4
Swing hanger pivot casting bolts.....	2
Bolts in Fox truck (jaw).....	2
Swing hanger.....	31
Swing hanger pivot.....	17
Center pins.....	273
Truck truss rods.....	39
Journal box.....castings	42
Journal box covers.....	14
Truck column.....	27
Bolster guide block.....	20
Swing hanger pivot casting.....	25
Swing hanger casting.....	4
Spring plank casting.....	8
Truck bolster chafing plate.....	3
Truck bolster.....wood	34
Truck transom.....	15
Spring plank.....	25
Truck springs.....	40

(Nuts without end.)

3,234

It will be seen that a large percentage of the repairs is on account of wheels and axles, journal bearings, journal boxes and covers, journal bearing wedges and

journal box bolts. These we have standardized for several classes of trucks, and if they were adopted and used by all of our members, it would obviate much of the difficulty in making truck repairs. On the whole, I shall say let us give up "rain-bow chasing" and save the time and labor spent in trying to adopt standard trucks.

If we can get standard wheels and axles, journal bearings and wedges, journal boxes (which determine their bolts) and possibly standard cross-sections for arch bars and diameter of column bolts for 60,000, 80,000 and 100,000 pound trucks, we will get all we can ever hope to compromise on in the present stage of the car builder's art, and practically all that will be necessary.

"(b) The relative efficiency of metal trucks of various forms as compared with each other and with the diamond truck, comprehending the cost of maintenance, the effect on wheels and journals, and as regards safety."

A great many designs for metal freight car trucks have been brought out, but my experience has been limited to two general classes, the type represented by the Fox, Cloud, Schoen and Hewitt trucks and the variations of the old diamond type of truck brought about by the introduction of metal parts. The relative efficiency of those of the first type as compared with each other would be a difficult matter to determine, and not having any data upon which to base a conclusion, I will leave the point for discussion by others who may feel themselves more competent or may have had the trucks under their observation.

With both kinds of trucks the function performed is to sustain the weight on the center and distribute it to the journal boxes. The trucks must do this over good surface and bad surface, over curves and tangents, at low speed and high speed. To do this efficiently the truck must retain its shape in all respects under the shocks and strains it is subjected to. It must remain square to keep the flange wear of the wheels and the train resistance at a minimum. The cross girders or bolsters must show little deflection, so that too much weight will not be thrown onto the side bearings and thus increase the resistance to curvature. The transverse strength of the cross girders, transoms or bolsters must be sufficient to resist the shocks of sudden applications of the brakes and buffing. The wheel shock must be cushioned in a manner to produce the least detrimental effect on the structure of the truck or body and also the track. It should be of such design, construction and material that failure of parts will be reduced to a minimum. Failure in detail increases cost of maintenance and decreases safety. It should not have too many vital parts which might by the failure of any one, wreck the truck, the car or the train.

We must also consider the facility and ease of inspection and repairs or replacements of parts subject to wear. The modern diamond frame truck, either rigid or swing motion, constructed entirely of metal, more nearly meets these requirements than its predecessor, constructed largely of wood and with gray-iron castings. The metal bolsters and channels are more rigid and less liable to sagging, decay and failure. The introduction of malleable iron parts has also resulted in a decrease of failures of these parts. But let us examine the repair records and see what are the weaknesses of the diamond truck and whether these improvements would eliminate them. We find that the various wrought-iron parts and bolts still remain, that the truck still depends upon too many vital parts, that it is still subject to failure in detail.

It might be said that the larger and heavier parts in the modern trucks will resist more effectually the shock and strains that they are subject to. In this conclusion I

think that we would be largely in error, as there have been many well-designed trucks under our older and smaller capacity cars which were fully as good for their class, barring the metal bolster, as the trucks under our large capacity cars. The latter are merely an enlargement to meet the greater carrying capacity of the cars and still embody all the vital parts and probably most of their weaknesses. These parts are failing as in the past, and these failures will increase as the cars get older and the carrying capacity greater.

The diamond frame type of truck was a better type for small capacity cars than it will be for 60,000, 80,000 or 100,000 pound capacity trucks. The frame is still subjected to all the wheel shock uncushioned and the strains induced by trying to force four wheels held in a rigid frame into contact with rail surfaces not lying in a plane. With our 60,000 and 80,000 pound trucks we retain the same wheel base as in our lighter trucks, but enlarge and stiffen the parts to carry the increased load, thus robbing them of a certain amount of elasticity which the lighter trucks possessed; otherwise I am unable to understand the large number of failures of arch bars in diamond trucks of large capacity and heavy parts which I have noted. In the matter of inspection, it is true that the arch bar truck permits an easier inspection of wheels than a plate truck, but the frame of a plate truck having so few vital parts and being subject to so few failures requires less time for inspectors and permits more time to be devoted to the wheels.

In the matter of repairs, the replacement of wheels requires more time in a truck with jaws than in the diamond truck, even considering the time consumed in handling inside wheels and rusty box bolts, but in weighing the matter, we must remember the length of life of wheels in freight service.

Facility in making repairs is certainly on the side of the plate trucks, as there are practically no running repairs to make, and shop repairs due to wrecks bear so small a proportion to the total that, even though the expense were greater, which I doubt, it would cut no figure.

From my point of view, a plate truck of the type represented by the Fox, Cloud and Hewitt trucks, is the most efficient truck for cars of large capacity. Properly designed and built in proper manner, with the right material, they will retain their shape in service, thus reducing train resistance and flange wear. The cushioning of the entire structure above the journal boxes decreases hot boxes and relieves shock and strain. The reduction of the frame to one piece practically, as far as handling and interdependence of the parts is concerned, increases safety and decreases cost of maintenance.

To come down to practical facts, the road I am connected with owns but fifty cars equipped with Fox trucks, but we handle N. Y. C., Erie and L. V. cars equipped with these trucks in large numbers, so that our men are perfectly familiar with them. The only failures that have occurred on our line were two cases when the trucks first came out. The side girders failed, beginning with a fracture at the bottom flange near the cross girder, and passing up through the rivet holes. It developed gradually. Since then we have had practically no running repairs to frames whatever on the many thousands of these trucks which we have handled. Our foremen all report satisfactory service for all such trucks coming under their observation. We know that the earlier designs developed some weakness, and have been changed once or twice, and for all I know when they get home to the owners

they may be like the "old one-hoss shay," and break down all at once, but we have never seen anything of it. The type of truck is what I am referring to, although in talking of my practical experience with the type, I am obliged to handle a particular one. It may be that none of the trucks of that type now in service are just right, but I firmly believe that the most efficient truck for the service lies along those lines, and that it can be built to last.

"(c) The results obtained by the use of metal body bolsters."

The body bolster is fully of as much importance as the truck bolster, although more attention has been centered in the latter. It is of little benefit to get a rigid truck bolster if your body bolster sags and permits too much weight to be carried on the side bearings, as side bearings are generally constructed. Go through any railroad yard and what do you see? Body bolsters nearly all sagged at the ends, especially the wooden ones. A wooden body bolster can no more be preserved in line in practical service than a wooden truck bolster can. Some time ago we had a little practical experience in this line, and to illustrate I will read the report of the foreman in charge of the work:

"There is considerable complaint from Operating Department that certain single-deck stock cars do not curve readily, and do not adjust themselves to straight track after passing curve. Last Monday, stock train with 35 of these cars and mogul engine stalled several times, and used 7 hours and fifty minutes making the run from Stock Yards to Michigan City, 69 miles. I have examined some of these cars and find that they have spring side bearings and that these side bearings compress about $\frac{3}{8}$ of an inch before center castings come to bearing. It required 750 pounds to compress one of the side bearings to a point where it is compressed when car rests on center plates. I note that the body transoms are crowning about $\frac{3}{8}$ of an inch, just about the distance that side bearings must compress. I would suggest that other side bearings be applied, or oak, $\frac{3}{4}$ inch thick, put between top center plates and body transom. I am of the opinion that this would give trucks more freedom to curve and prevent further complaint."

"Referring to my letter to you dated April 30, in reference to stock cars heavy on side bearings. I wish to report that we raised the center of 35 of these cars, as you instructed me to do; 32 of these cars were placed in train at Stock Yards May 5, with two double-decks which had not been raised, and one box car, all loaded, making a total of 35 cars in train. Engine 274 (mogul), the same engine which could not handle train previously, was coupled to train. The run was made from Union Stock Yards via Chappel to Michigan City in 3 hours and 40 minutes, or 4 hours and 10 minutes less time than the same engine with the same number of cars made on the previous occasion; train did not stall at any point and speed of train on worst curves and grades was not less than ten or twelve miles per hour. Of the 3 hours and 40 minutes consumed between Union Stock Yards and Michigan City, 34 minutes was lost getting orders, letting horse special pass, and taking water at different points.

"From this test it is evident that a great share of the trouble is due to the condition of bearings on stock cars. These cars can be raised $\frac{3}{8}$ of an inch at centers for 35 cents per car, and the expense would soon be saved in coal that is required to handle them."

There are a number of designs of metal body bolsters in service ; those I have observed are the pressed steel, the "I" beam and the double-plate types. I will leave discussion of the first two for those who know more about them. In the latter type, where one plate is used under compression and the other under tension, it is difficult on account of lack of depth to get a good truss with a single bolster. In my opinion, the double bolster similar to what is commonly used on passenger cars gives better results, and in either case better results could be secured with the ends of the plates more accurately and positively fastened.

MR. MITCHELL: Mr. President, is the time up ? [Laughter.] I have a little information which perhaps might be of interest to the Association as to the cost of the metal truck, if you will allow me to give it.

MR. HENNESSEY: I move that the time be extended, Mr. President. (Seconded.)

MR. MITCHELL: We are referred to as large users of the metal truck, and for the benefit of the members I will state that we commenced to use only one type of this truck in 1891. At the present time we have 8,000 cars equipped with this truck. During this time, outside of the trucks returned subject to guarantee, failing on account of poor metal, we have broken in wrecks eighty trucks. Out of those eighty trucks, thirty-two were returned to the makers for repairs. The cost of the repairs by the makers averaged \$28.21 each. The cost of the repairs of the forty-eight trucks which we repaired averaged \$5.32. The average cost of repairs of all trucks, including those returned to the makers and those that failed on our line, was \$15.09. That covers the entire period from 1891, but does not include the trucks returned failing on account of poor metal. The average age of those trucks is, I presume, three years and a half.

THE PRESIDENT: The time has been used up for topical discussions. The next report will be on the prices in the Master Car Builders' Rules, to report what changes are desirable.

MR. RHODES: May I ask what time we expect to adjourn?

THE PRESIDENT: Half-past one is the time.

MR. CLOUD: We are distributing this report now because it was not ready when the reports were mailed to the members, and it ought to be in their hands today, and it was thought you might probably want to direct its consideration tomorrow when the Rules of Interchange are considered. It is being distributed now so that you may have it for consideration in the meantime.

THE PRESIDENT : Are you going to postpone the consideration of this report until tomorrow ? If so, a motion to that effect would be in order.

MR. POTTER : I make a motion to that effect.

The motion was carried.

THE PRESIDENT : The next report is on Standard Wheel and Track Gauges, committee to confer with the American Railway Association.

MR. POTTER : Mr. Chairman, in the absence of Mr. Barr I represent him. As most of you know, Mr. Barr has been ill for a number of months and has been incapacitated for performing work. For that reason the committee has not been called together ; but the only subject before the committee was the one referred to at the last convention — to make tests and determine the relative resistance of cars with wheels gauged to the standard of the Association on track of 4 feet 8½ inches and 4 feet 9 inches gauge. As I said, the committee had not been called together by the chairman, due to his illness, and the matter was referred to me. Later on, at Mr. Barr's request — he asked me to take up the subject — it was rather late when my attention was called to it, and it was contemplated to make these tests on the Cincinnati & Muskingum Valley Railroad, on which there is a piece of track suitable for this purpose. In April this division suffered very heavily from the floods, so that their allotment of rails was used up in making the repairs. I mention that because the rails on this piece of track were found to be not in suitable condition for making tests, and it was contemplated to replace this rail. Your committee would, therefore, ask for more time, and would hope to submit a satisfactory report at the next convention. I would state that the management has decided to change that rail during the late summer or fall, and be in shape to make a test during the latter part of this year or the early part of next.

THE PRESIDENT : This is a standing committee. It will not be necessary to make any motion to extend the committee. The next report is on Brake Shoe Tests, Mr. S. P. Bush, chairman.

MR. BUSH : Mr. President, the committee on brake shoe tests has no formal report to make this year, for the reason that the committee has not found that there were enough really new brake shoes in the market to warrant going to the expense that a long series of tests involves, therefore nothing has been done in the way of tests during

the present year. It is possible that during the coming year some tests will be made. I will state for the information of the Association that the brake shoe testing apparatus of the Association, which has heretofore been kept at the works of the Westinghouse Air Brake Company, gratuitously, has been transferred to the Purdue University. This University made a proposition to the Association through the committee to transfer that apparatus, guaranteeing to take good care of it, so that it could be operated at any time by the Association, guaranteeing to keep it in condition and insure it against loss, and in case the Association or committee desired to make any tests at any time, that they would furnish necessary power and facilities for operating it, with such assistance as the University may be able to afford at that time. The formal proposition was submitted to the committee, and in turn it was submitted to the Executive Committee through the Secretary, with the recommendation that the transfer be made. The Executive Committee thought that it was desirable to make the change, and they authorized the change of location; and I would say now that the apparatus is now in the University and is nearly ready for operation. The following is a copy of the agreement with Purdue University concerning this transfer:

LAFAYETTE, IND., April 4, 1898.

Mr. S. P. Bush, Chairman, Committee of the Master Car Builders' Association on Brake Shoe Tests, Columbus, Ohio :

DEAR SIR,—The undersigned, acting in behalf of Purdue University, respectfully submit the following statement as a reply to your letter of March 28, addressed to W. F. M. Goss, concerning the proposition to transfer the brake shoe testing machine of the Master Car Builders' Association to the Laboratory of Purdue University.

It is assumed by the University, that the proposition involves the machine as described in the Proceedings of the Association; that accessory to the heavier parts of the machine are a dynamometer and a chronograph which are to be considered a part of the complete plant; that the actual cost of designing and constructing the machine has been \$3,500, and that its present value is \$2,900. It is assumed also that the plant does not include engines or other means of driving the machine.

With this understanding the University feels that they are justified in doing everything which can fairly be asked, to bring about the proposed change of location, and to this end the following propositions are respectfully submitted:

1. The University will agree to meet transportation charges (if any), will supply foundations, and will set and erect the machine, all without cost to the Association.
2. The University will agree to supply a suitable engine for driving the machine which shall always be available for work with the machine.
3. The University will agree that the plant shall always be available for the use of the Master Car Builders' Association, and that it shall be maintained by Purdue

in a thoroughly complete and efficient condition, and that no work which may originate at Purdue shall ever be allowed to interfere or conflict with work which the Association may care to undertake. The understanding is that the University is not only to make the plant available for the purposes of the Association, but in return for concessions granted, it is to supply power and such other conveniences as the Laboratory may afford, all without cost, whenever these may be required by the Association.

4. The University does not obligate itself to supply labor or to perform work gratuitously, upon the machine for the Association, but it promises to coöperate with the Association in every way that is practicable, and it is expected that the presence of the machine in the University laboratory will result in work of research being done by the University, which shall have permanent scientific value, and which shall materially assist in the upbuilding of railway interests.

5. It is understood by the University that when the apparatus shall have been located in its laboratory, it shall be used by the University as though it were Purdue property; that is, the laboratory authorities shall be free to conduct investigations upon it in connection with the routine work of students or employ it in such work of research as may seem desirable. It is understood also that should a manufacturer of brake shoes, or anyone, desire work to be done which might not be of a scientific character, but designed for purely business purposes, the University may serve him as a matter of business, collecting a sufficient fee to cover the cost of the investigation.

6. To secure the Association against loss by fire, tornadoes, etc., the University will maintain insurance upon the machine in the sum of \$2,900, the policy being drawn in favor of the Executive Committee of the Master Car Builders' Association and their successors, the policy to be held by the Secretary of the Association, the premiums, however, to be paid by the University.

7. The responsibilities to be assumed by the University, as outlined in the foregoing propositions, will become effective upon the delivery of the machine.

Signed in behalf of Purdue University,

J. H. SMART, Pres't University.

CHARLES B. STUART, Pres't Board of Trustees.

W. F. M. GOSS, Director, Engineering Laboratory.

Accepted in behalf of the Master Car Builders' Association by

S. P. BUSH.

R. P. C. SANDERSON.

GEO. GIBBS.

THE PRESIDENT: The next report is that of the Committee on Rust from Salt-Water Drippings, Mr. Higgins, chairman.

Mr. Higgins read the following report:

REPORT OF COMMITTEE ON RUST FROM SALT-WATER DRIPPINGS.

To the President and Members of the Master Car Builders' Association:

The origin of the inquiry as to the damage resulting from salt-water drippings is clearly set forth in some remarks that were made by the chairman of the present committee during the Master Car Builders' Convention of 1897.

Ever since this subject was first brought to public attention, in 1896, there has been an effort on the part of the owners of the refrigerator cars in which dressed beef is handled to create the impression that salt-water drippings were not doing any particular harm, and might be neglected. The fact that the Master Car Builders' Association has thought it necessary to appoint a committee to prepare a report on this subject is sufficient answer to the claims of the owners of refrigerator cars that the salt-water drippings are not harmful.

The information received by the committee indicates that more interest is being taken in the subject by the officials in charge of the track and bridges than by those in charge of the rolling stock, which is accounted for by the fact that the track and the bridges are being more damaged by salt-water drippings than the car trucks.

It should be understood that the salt-water drippings come from refrigerator cars loaded with dressed beef. In such cars the mixture used for cooling purposes is composed of ice and salt, the proportion of the salt to the ice varying from 6 per cent to 11 per cent, and one refrigerator car will produce about 200 gallons of salt water or brine every twenty-four hours, which on an average will contain $8\frac{1}{2}$ per cent of salt.

At one icing station where 5,200 cars were taken care of, that number of cars was supplied with 6,072,000 pounds of ice, and 503,000 pounds of salt.

Replies to the circular of inquiry sent out on November 22, 1897, have been received from railroads that handle about 55,000 refrigerator cars loaded with dressed beef per year.

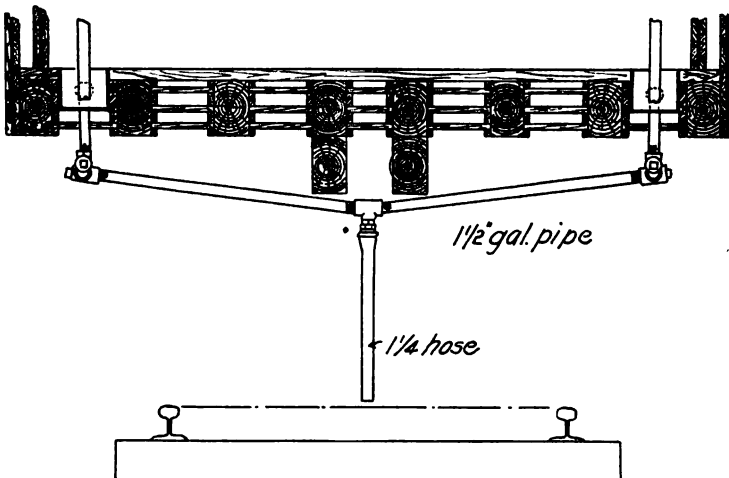
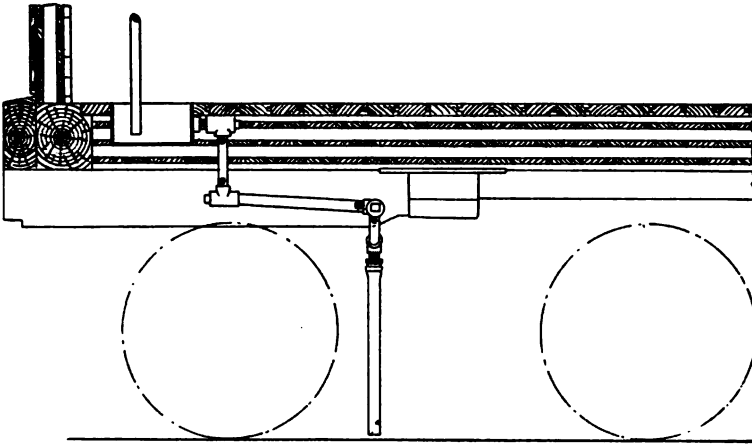
The committee started out with the idea of having refrigerator cars fitted with one or more reservoirs, to be attached underneath the car body, into which the salt-water drippings could be conveyed, the reservoirs to be large enough so that they would not have to be emptied more than once every twelve hours, at division terminals, where proper provision could be made for taking care of the salt water. This idea, however, met with so much opposition on the part of the refrigerator car owners, that the committee abandoned it, not caring to recommend an arrangement that the refrigerator car owners would be unwilling to adopt.

The committee presents two methods that can be followed without much expense, either one of which will improve the present condition of affairs; and although a patent has been applied for in the case of Design No. 2, it is the opinion of the committee that Design No. 2 will give the better results. Design No. 2 will be the more expensive, but will not cost to exceed \$5 per car, including a royalty, if the patent is granted. The principle of both designs is to convey the salt water so that it will drop between the rails, at about the center of the track, where it will do little or no damage.

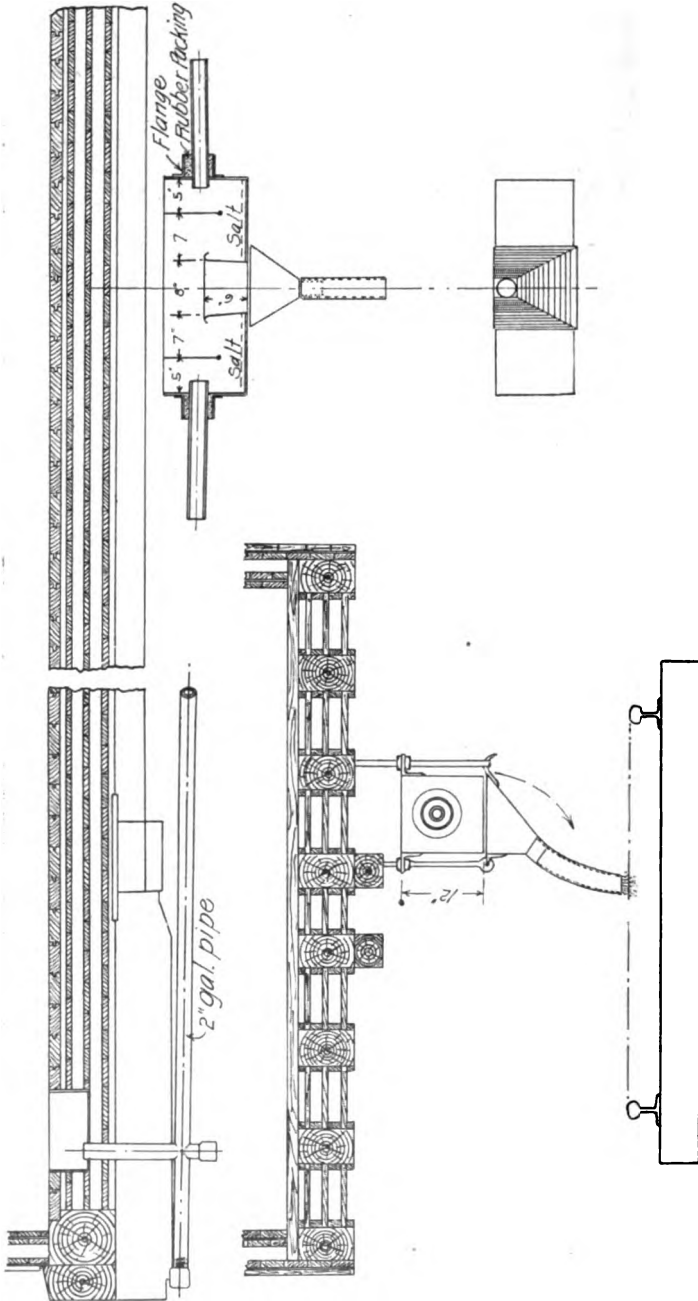
In fitting up a refrigerator car with either type of attachment, care should be taken to provide caps or plugs at proper points, so that the pipes can be readily cleaned out, and galvanized iron piping should be used, in order to resist the corroding action of the salt water or brine in passing through it.

S. HIGGINS,
A. M. WAITT,
Committee.

SOUTH BETHLEHEM, PA., May 20, 1898.



No. 1.—DEVICE FOR DISPOSING OF SALT-WATER DRIPPINGS.



No. 2. Device for disposing of salt water drippings. Patent applied for.

THE PRESIDENT: Gentlemen, you have heard the report. What is your pleasure?

MR. LENTZ: I move that the report of the committee be received. The motion was carried.

THE PRESIDENT: The report is now open for discussion.

MR. GEORGE GIBBS: I would like to ask how this arrangement shown by the committee would help to preserve bridges. Apparently it consists of a reservoir which fills and then overflows. Is not that as likely to overflow on a bridge as if you had not any reservoir there?

MR. HIGGINS: I would answer Mr. Gibbs by stating that the protection of bridges would be better provided for by a cheap covering on the bridge itself, rather than by attempting to keep the salt water from dripping on there. Furthermore, as a rule, on the bridges there is not the same tendency to rust. It seems to run off and disappear, and letters I have received — not so much from the members of this Association as from roadmasters and general superintendents — seem to indicate that they prefer to take care of the bridges in another way.

MR. HENNESSEY: The officials of the C. M. & St. P. R. R. took this question up, and they were of opinion that they could not see any probable damage to the track or bridges, and we rather felt that that was a question that the refrigerator car owners were more interested in than the railroad companies.

MR. WAITT: So far as my knowledge and experience have gone in this matter, it has differed somewhat from Mr. Hennessey's. Some three or four years ago our chief engineer made a very grievous complaint on account of the serious damage that was being done to the track at certain points on the road, owing to salt-water drippings. I know that some of the refrigerator car owners rather scout the idea that very much damage is done, but nevertheless it is a fact. Within a few months our General Superintendent received a letter from the Assistant General Superintendent of the Atchison, Topeka & Santa Fe, in which he gave facts as to the condition of things on their line, which showed very much worse injury to their tracks than we had experienced on the Lake Shore; and there is no use in covering the matter up. There is serious damage being done to new rails being laid, to the splice bars especially. It is not possible to coat them with paint as you can coat the members of bridges, and it seems to be necessary and it would seem to be advisable for the Association to have something in the way of recommended practice for preventing, as far

as seems feasible, this damage. And it can be done to a great extent if the water is by some means conducted in the center between the rails, instead of dripping right down over the rails, as it does in most cars at the present time. But I would like, for one — I hardly like to make the motion, being on the committee — but I would like, for one, if these two designs are considered practicable — and the committee think they are — for one or the other at least to be placed in our Recommended Practice for use on refrigerator cars. I think it would bring it more prominently before the refrigerator car owners, and the moral effect, as well as the indorsement of the Association, would go a great way toward some provision of the kind being taken to help the railroads out. The refrigerator car owners are not the sufferers, the railroad companies are ; and it seems no more than right that they should try, in a peaceable and not expensive way, to ask the parties who are running their cars and allowing salt water to drip on the track, to help us by using some means of this kind to prevent it.

MR. POTTER : I move that the report of the committee be adopted and that design No. 1 be submitted to letter ballot as Recommended Practice. (Seconded.)

THE PRESIDENT : The motion is to submit No. 1 only to letter ballot as Recommended Practice. You have heard the motion. Are you ready for the question ? All in favor please say "aye" ; contrary "no."

The motion was carried.

MR. RHODES : Mr. Chairman, it is almost the hour to adjourn. The next subject that comes up is a pretty important one, and while I understand there is no report, there may be considerable discussion upon it, and I would move you that we adjourn to meet tomorrow morning at 9 o'clock.

The motion was carried, and the convention adjourned until the following day.

SECOND DAY'S PROCEEDINGS.

The convention was called to order on Thursday, June 16, at 9:15 A.M.

MR. CLOUD: The Executive Committee has directed that the following letter from Mr. R. M. Galbraith, General Master Mechanic of the St. Louis & South-Western Railway Company, be read in convention, because of the importance of the subject-matter since locomotives are being loaded more largely on a tonnage basis:

PINE BLUFF, ARK., September 13, 1897.

Mr. John W. Cloud, Secretary, M. C. B. Association, the Rookery Building, Chicago, Ill.:

DEAR SIR,—At the twenty-second annual convention of the International Association of Car Accountants, held at New Orleans, March 5 of the present year, the following resolution was adopted:

"Resolved, That foreign cars found not bearing any light-weight marks, or bearing incorrect light-weight marks, or which have received repairs likely to increase or decrease their weight, should be re-light-weighted and stenciled, and this information furnished the owner, giving the new weight, and the old weight if any."

We have, of late, been giving special attention to the weighing of our cars, and also of all foreign cars on which we were doubtful of the correct weight, which we carefully weighed and stenciled the weight thereon, notifying the owners of such re-weighing. We find a great many private line cars have no light weights on them, and upon notifying some of them of our having stenciled their cars, they requested that we desist from the practice. I believe it is the intention of the Association to afford our railways all the protection they deserve in such matters, and I deem it only proper that all cars should have their light weight stenciled on them, as well as their capacity, size of journals, etc. I would be pleased to have you bring this matter before the proper standing committee, that it may be given the attention I think it deserves, and be presented to the Association for appropriate action at its next annual meeting.

Yours truly,

(Signed)

R. M. GALBRAITH,
General Master Mechanic.

THE PRESIDENT: You have heard the communication. What is your pleasure in the matter?

MR. MITCHELL: I would like to ask if there is a standing committee on that subject?

MR. CLOUD: There is not.

MR. MITCHELL: I move that it be considered, then, by the Association.

THE PRESIDENT: The matter is open for discussion.

MR. MITCHELL : It seems to me that it is very essential that all cars should have their light weight stenciled upon them, and I would make a motion that this Association indorse that practice and make it recommended practice of the Association that all cars shall have the light weight stenciled upon them. (Seconded.)

MR. SCHROYER : As a recommended practice ?

MR. MITCHELL : As a recommended practice — I do not know, perhaps we better have it standard. Everybody is going to the tonnage basis, and I think the light weight should be stenciled on the car so that we can utilize it in the tonnage. So I make a motion that we make that our standard practice.

THE PRESIDENT : Gentlemen, you have heard the motion. Are you ready for the question ?

MR. BUSH : Mr. President, I understand that private car owners, in fact, I know that private car owners do not as a rule do it, and they have some objection against it. I would like to hear from some of the private car owners in regard to that.

THE PRESIDENT : Is there any further discussion on the subject ?

MR. WAITT : Mr. Chairman, is the motion of Mr. Mitchell understood to be that that matter is to be submitted to letter ballot as a standard ?

MR. MITCHELL : I will accept that amendment.

THE PRESIDENT : Is there any further discussion ?

MR. CLOUD : I think it ought to be understood whether it is intended that cars coming along, which do not have light weights marked on them, could be weighed and marked by any parties and reported to the owners.

MR. MITCHELL : Mr. President, it might be advisable to refer that to a committee. There are so many private lines that are not, perhaps, represented here, that it might be advisable to refer that to a committee to investigate the subject. There may be some good grounds why it should not be done, although I cannot see any. If the private lines are represented here, I would like to hear from them.

THE PRESIDENT : Is Mr. Parker, of Kansas City, in the house ?

MR. RHODES : Is Mr. T. B. Kirby in the house ?

THE PRESIDENT : Is Mr. Bowen here ?

MR. MITCHELL: If I can modify my motion, I will recommend that a committee be appointed to confer with the private lines and report tomorrow on this subject, that such committee should contain at least two members from private lines.

MR. BUSH: I second the motion.

THE PRESIDENT: You seconded the former motion, didn't you, Mr. Morris?

MR. MORRIS: Yes.

THE PRESIDENT: Is that acceptable to you?

MR. MORRIS: Yes, it is acceptable.

THE PRESIDENT: You have heard the motion, gentlemen. Are you ready for the question that the matter be referred to a committee to report tomorrow. Is that it, Mr. Mitchell?

MR. MITCHELL: Yes—I would suggest a committee of five, at least two members of which are to be representatives of private lines.

THE PRESIDENT: Are you ready for the question? All in favor will please say "aye"; contrary, "no."

The motion was carried.

The Chair names the following committee on this subject, to report tomorrow: Messrs. Mitchell, Stark, Bush, Parker and Bowen.

MR. CLOUD: The Chairman desires that I read the following communication, which is from Mr. Moseley, addressed to Mr. Crone, in response to a request to address us at the opening of this convention:

S. A. Crone, Esq., President, Master Car Builders' Association, New York, N. Y.

MY VERY DEAR SIR,—I deeply appreciate your kind invitation to be present and address the approaching annual convention of the Master Car Builders' Association, and regret that official duties, involving a journey to the Pacific Coast, compel me to deny myself the pleasure of meeting with you on that occasion. If my inclinations could prevail, be assured I should be most happy to accept. I am much gratified by the honor tendered, and would be more than delighted to embrace the opportunity of meeting so many old friends and of making the acquaintance of others whom I have long wished to know.

Many of your duties relate only to commercial or material interests, but the persistent efforts of your Association, extending over a quarter of a century, to secure the safety of those engaged in railroad train service by provision of those uniform and automatic devices which alone can guard against ever-present danger, to my mind entitle your body to grateful recognition, not only by the vast army

of railway employes, but by all classes of our people. That the world is never indifferent to the demands of humanity is being continually proven, and right now the call to interfere by force of arms in behalf of the helpless, the suffering and the oppressed is responded to with practical unanimity throughout the nation.

If time shall demonstrate the necessity of changes in legislation regarding railway equipment in the matter of safety appliances, the advice and experience of that body, of which you have the honor to be the head, will again, as they have in the past, undoubtedly be of the greatest consideration and assistance in determining on what lines and in what degree the alterations should be made.

That American railway travel has become almost the safest condition in life is due most largely to the care, intelligence and experience which have given the humblest bolt the rank of an engineering problem, and ignored no appliance tending toward the stability, capacity, general utility, and longevity of the instrumentalities of transportation.

I, too, have given more than a decade of my life to the study of some features of this subject and may therefore be indulged in the expression that no one appreciates more thoroughly than I the great debt which the public owes to the mechanical genius of the Master Car Builders' Association. The ordeals to which your experience has subjected inventions and adherence to the principle of survival of the fittest, have evolved a system of car construction which is infinitely superior to those of other countries.

With renewed assurances of my appreciation of the honor conferred by your invitation, and again regretting my inability to be with you,

I am, very truly yours,

EDW. A. MOSELEY.

MR. CLOUD : The following announcement is handed in :

"An interesting and instructive exhibition of the Westinghouse draft gear can be seen by all interested on the D. & H. tracks east of Saratoga station at any hour on the days of the convention.

THE PRESIDENT : We will now take up the reports of the committees, if no other business be offered first.

MR. RHODES : Mr. Chairman, we are ready to report on the report of the Committee on Conference with Auditors, which was referred to the Arbitration Committee. This matter was discussed at the meeting held here yesterday afternoon, and an expression was had of the general views of the members who attended, and later in the evening the committee further considered it and makes the following report :

The committee recommends that the report be accepted and spread on the minutes, and that a copy be transmitted to the Railway Accountants' Association with the statement that while the M. C. B. Association is in sympathy with the general intent of the recommendations, it does not feel that the M. C. B. Association is the channel through which recommendations 1, 2 and 3 of the report can be enforced. Recommendation 4 can be cared for by the M. C. B. Association.

THE PRESIDENT : Gentlemen, you have heard the report. What is your pleasure in the matter?

MR. BUSH : I move the adoption of the report.

The motion was carried.

MR. LENTZ : Mr. Chairman, I now move that the committee to confer with the auditors be discharged. (Seconded.)

The motion was carried.

THE PRESIDENT : If there is nothing further, we will proceed to the reports. Trains Parting is the next report ; Mr. B. E. Thompson, chairman.

MR. CLOUD : Mr. Thompson is not here, so far as I know, and I would say that the committee has not sent a report in to the Secretary.

THE PRESIDENT : Are there any remarks on this subject?

MR. RHODES : Mr. Chairman, I think that many of the members of the Association have looked upon this subject with a great deal of interest, and had hoped to have a report, and it seems to me a very pertinent question is, Why is there no report ? I believe that there is an undercurrent of feeling among our members that there is hardly a more important subject now to be dealt with by railroads. I judge so, because in the topical discussions, and in the recommendations for committees, we find that there is a tendency to discuss questions all of which relate to trains parting. At the present time a law is to go into effect which will affect largely the safety of trains while in service. I have been a little surprised to see the sort of blind confidence that everyone connected with the subject of couplings between cars has. No one questions the character of the coupling, or the kind of material that is put into it. But it seems to me that some one must have confidence that some people are looking after it, and I believe that this sort of blind confidence is in our Association. I believe that up to the present time it has been thought that it was not necessary to describe the mechanism of a coupling, or describe the character of the material that goes into it, because our Association has done such good work in the past that the public believes we will continue doing it. I think that that is quite a gratifying condition to reach, and I do hope that we will continue to merit it. Not very long ago I was traveling over our road — and while it is true that accidents to through freight trains, as was stated by one of the Commissioners at our opening yesterday, have been largely reduced, and there are fewer

deaths than we have had in the past, nevertheless accidents do occur, and whatever perfection we reach there will still be a class of accidents that may happen and will happen more frequently than others — and on our road I was told not very long ago that although we very seldom have any accidents, the one that most frequently occurs is that of breaking in two. A couple of years ago in this hall it was voiced quite largely that break-in-tuos were very serious, and I believe it behooves us well to consider what we are doing to prevent the break-in-tuos from even occurring, we will say, as seldom as they do occur. Now, I think that one move that has been made by some of the prominent and larger coupler companies is to be commended in the highest way. In the first place, the price of the product has been reduced in such a way that it is no longer an incentive for new companies to enter into the field. Then, again, these older companies in their replacement prices, instead of only taking back their own material, take back any material which is made in the form of the M. C. B. coupler. I think that is one of the most commendable moves that the manufacturers of couplers have made. It at once draws attention to the character of material which some of the newer companies are trying to force upon the railroads. Some years ago a good deal of talk was made in this Association because some railroads had put into service cast-iron knuckles, and we introduced a clause in our rules to prevent that, or to show that we discountenanced that kind of material. I have recently seen, and people in my vicinity of the country are well aware, that actually the M. C. B. bar has been put into service made of cast iron — the bar itself, not the knuckle. Now I do not hesitate to say that any railroad company or any manufacturing company that puts an M. C. B. cast-iron bar into service, lays itself open to serious charges, and I propose, for one, if anything of that kind is discovered on the equipment of cars passing over our road, to make it just as prominent as it is possible to make it. I think that that is what we want to do as an Association, and as members of the Master Car Builders' Association. If anybody through ignorance or any other cause attempts to manufacture unsuitable material and to put unsuitable material on the cars which we pass all over our lines in this country, we must make prominent that negligence and that indifference to the safety of railroads and of trainmen and passengers on our lines.

Now, let us ask, What is there that we can do in this respect? In the first place, a move has been made at this meeting for specifica-

tions for drawbars and couplers. Now, let us all go at that with some intention of having some kind of a specification. Let us ask ourselves, How can we have a specification for wheels and have a specification for axles and at the same time have no specification for a coupler? It does not seem to me that any management of a railroad can consistently say that they will not put cast-iron wheels under cars without specifications, and at the same time take any kind of an M. C. B. bar and put it in service without knowing anything about what specification it will stand. In so far as the government legislation is concerned, we all know how fully the government appreciates specifications. Not only do they have specifications for their materials, but they have tests and thorough investigations of their material, and how good those specifications and tests and investigations have proved is shown by the excellent results produced by our vessels and our guns, and we may rest assured that those who want safety appliances on the railroads of this country will indorse in every way investigations and specifications for such material.

The other day I was out West, and on returning to my headquarters the first thing I saw was that a bad accident had occurred on our line through a break-in-two. Now, the first thing I wanted to know was, what had caused that break-in-two. Suppose I had been applying cast-iron drawbars and it was discovered that one of those cast-iron M. C. B. couplers had broken. Suppose that we had been applying inferior knuckles and it was discovered that one of those inferior knuckles was broken—one life was lost and two or three persons badly injured—suppose we knew that as matter of fact we had not tested our drawbars, and we did not know really what the character of the drawbar material was—I would have felt quite embarrassed; I would have felt perhaps that I had not been doing my duty as I ought to have done it. As a matter of fact, none of these conditions affected me at all, because, so far as my information went, I felt that we were buying the best and the safest and the strongest bar that we knew of. Perhaps we do not know what is the best, but when we do know we will try to get it. The investigation of the break-in-two showed this, that a link had broken between two cars. It was on a grade and the rear part had run back and collided with the coming train. Those who were in the way-car were badly injured. Investigation resulted in confirming the work of this Association. This Association has recognized that the link-and-pin is not a safe coupling between cars either for trainmen or for the movement

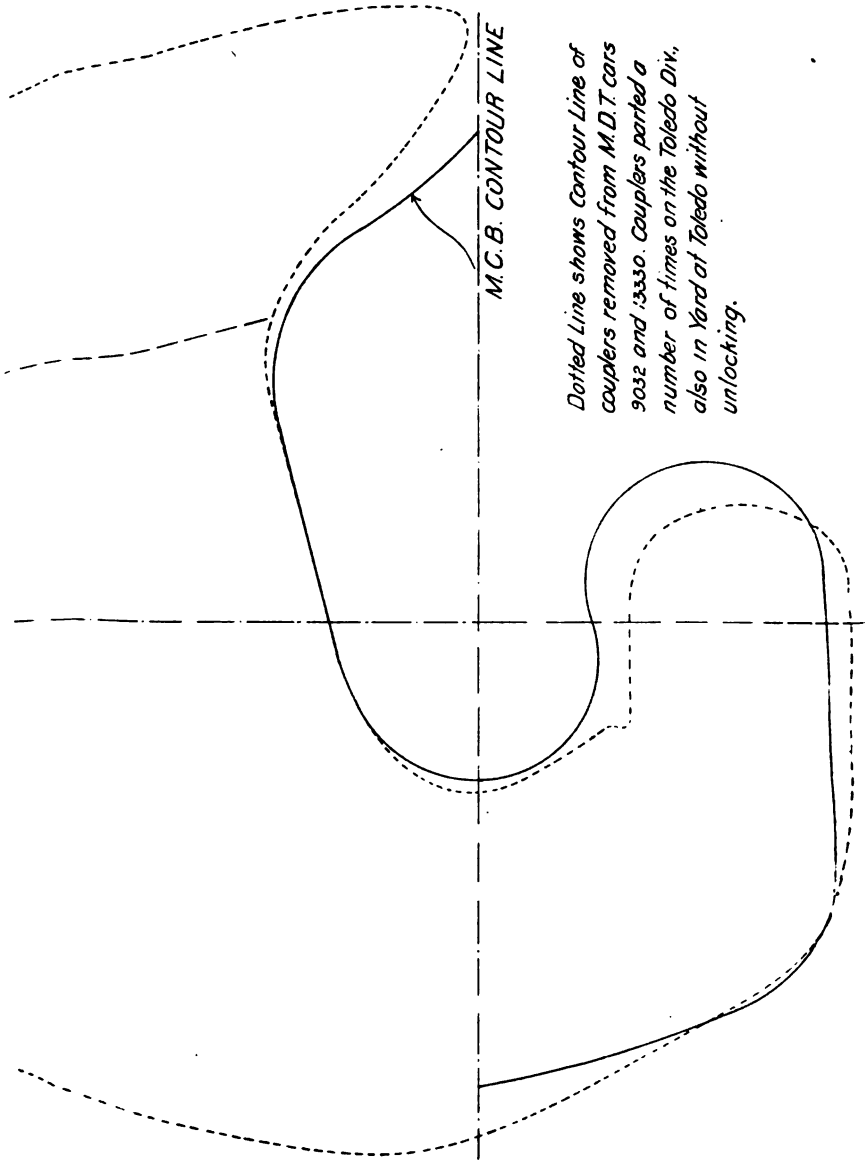
of trains. Our brake tests at Burlington showed conclusively that it was utterly unsafe. In making a stop we could hardly make a stop without the pin flying out and causing these break-in-tvos, so it was a cause of satisfaction to me to find that the style of coupling which had been abandoned by the M. C. B. Association and which we were no longer introducing was the cause of that break-in-two.

When bars are sent to be tested or to be tried on a railroad I believe it is the practice of a good many to accept those bars if made of proper material to put in service. Now, I would like to see the members of the Association never do that, but would urge that the first thing to do when you receive half a dozen bars, or two bars, or three bars, is to put them under the drop test and see what kind of material they are made of. If it stands the drop test, and you have reason to believe that the others are as good, put them in service, but never put them in service without putting some under the drop test. Another thing is, I would keep a record of every break-in-two that occurs. I think that is exceedingly important. When a car parts, find out which knuckle is open, get the name of that coupler and keep a record of it, and if it parts without either knuckle opening, that is a matter also of which a record should be kept, because there may be conditions of wear or conditions of construction which would permit that to happen. I would keep a record of that also. In getting cars over our railroads from different lines, there will occasionally come up conditions which we cannot control. For instance, some neighbor may have a C. B. & Q. car; it may be causing trouble; it may be parting. They may say: "We cannot control the C. B. & Q. cars." There is one thing you can do—you can write to the Motive Power Department of the Burlington road and explain that such and such a break-in-two occurred on your road with C. B. & Q. cars fitted with such and such couplers. When we have done that and given that kind of information around generally, I believe we will finally know the couplers which cause break-in-tvos, the kind of draft rigging which causes break-in-tvos, and by following up those cases carefully we will help very materially to know what is the best kind of coupler to use, and the best kind of attachments to use, and I would urge the members of the Association to follow this up very closely. We cannot afford to have devices in service that are not reliable; our trains run at too high speed, and the connections between cars must be safe. [Applause.]

MR. WAITT: Mr. Chairman, as the subject of this committee's report that was to have been presented is very similar to the subject which was assigned to me in the topical discussions, I think I may take the opportunity now of speaking on it, there being a little more time than would be given for the general discussion of it under the ten minutes limit. I am very sorry, for one, that the committee has made no report. I think that the subject is of vital importance to the railroad companies, and of enough importance to have given it a great deal of consideration. To be sure, it was taken up last year. I know that from my own experience in investigating the subject last year in connection with the report that was presented, that information was obtained which was made use of on the Lake Shore and has quite materially reduced the number of break-in-twos. Many cases of break-in-two were discovered and were enumerated in the report, and those causes have in many cases been removed. It seems to me that as the Association has found it wise to have a permanent committee on triple valve tests and a permanent committee on brake shoe tests, that right in line with that as a proper subject for permanent committee work the subject of couplers would come in, and I for one would like to see a standing committee of the Association take this subject up and consider it in its broadest sense. I propose for the first year putting upon them the duty of considering special limit gauges, and considering besides that special tests for couplers, and let it be a standing committee to take the subject up from year to year in its various phases, being assisted for the first year by committees on these two special subjects — specifications and tests for couplers and limit gauges for wear of couplers. And then, afterward, if such a standing committee could act, as we hope the triple valve committee will have occasion to act, making tests of couplers from time to time, and possibly working out a wise plan for certifying to the Association couplers that satisfactorily stand the required tests. I think that would go quite a step in advance in getting the best couplers retained and those that are not worthy of use culled out. It seems to me that with the fifty or a hundred or more of the M. C. B. couplers at the present time, it is in the line of economy and wisdom to ask the question whether we can afford to be dealing with so many different kinds and styles of couplers of all degrees of efficiency in working, and all degrees and qualities of material that are used, and I hope that one of the results of this convention will be to estab-

lish a permanent committee in connection with this line of work ; and I think if we should wish to carry on official tests in years to come, that there are institutions like Purdue University which would only be too glad to assist, to take the apparatus in charge and give assistance in making tests that would be of great value to the railroads of the country. During the past year I think it is safe to say that many of the coupler companies have carried out some of the suggestions that were made by the Committee on Trains Parting last year, and have made improvements in their couplers to avoid some of the difficulties or some of the weak points that were at times causing the parting of trains.

The question is asked whether it is necessary to have any additional device in order to prevent trains parting. We know that one of the sources of trains parting with some couplers is on account of some sort of a creeping action that raises the lock and lets the knuckle open. That evidently must be caused by the cars not being kept at a uniform distance apart, sometimes slacking up and sometimes pulling apart. With our heavier trains, and heavier capacity cars, it seems to be a proper question whether or not we have not need to make a provision to keep the cars steady and to keep them from having the lateral and the longitudinal motion that they now have, by means somewhat similar to what we have in our passenger trains. Consideration was given last year, and I think is still being given, to the use of some sort of buffing device, something to keep the cars where they should be, and to prevent the breaking of the couplers by unusual shocks that they get in switching. There are various devices of this kind in use, and I believe, as the capacity of our cars increases and the length of our trains increases, we have got to consider this very seriously. There is one point especially that I think must receive attention this coming year, and in fact right along, and that is deciding on some limit for permissible wear in the couplers. We are beginning now, as nearly all of our cars on many roads are equipped with the automatic coupler, to find that the couplers will sometimes come apart without unlocking. If that is so, there is a cause for it, and we have tried to investigate a number of cases of this kind and we think we have found some of the causes. I have here a blue print which I wish every member of the Association could see. It gives the contour line of the M. C. B. standard coupler and the contour line of the M. C. B. coupler which uncoupled a number of times on a number of divisions of our road, and then again once or twice in one of our yards. We had it removed



from the car and made a careful diagram showing the exact shape of it. The dotted line on that diagram shows the shape of the coupler that was removed from the car. The full line shows the shape of the M. C. B. contour line, and it will be seen that this coupler which was running, on account of wear and on account of the bending or distortion from some cause or other, of the guard arm, the opening between the knuckle and the guard arm was more than an inch above what the standard contour line would permit. The result was that this coupler uncoupled four or five or six times in going over the road without either of the knuckles opening, and then it would couple again, just as easily, without opening the knuckles. We have got to provide against anything of that kind. We had a meeting some time ago of our Division Master Car Builders to consider the subject, and several gauges were submitted which were sent out for trial to be reported on at a future meeting. The result of that has been the adoption of a gauge which will apparently overcome the objectionable features to the first one that was put in service, and I have been looking around for Mr. Fildes, our Division Master Car Builder at Chicago. Have you the gauge with you, Mr. Fildes?

MR. FILDES: No, I have not.

MR. WAITT: Mr. Fildes had one of the gauges with him, and I hoped he had it here this morning. But as a suggestion to whatever committee will look the matter up, or the members of the Association, I would say that we must limit the bending or distortion of the guard arm. We must limit the change of the condition of the knuckle by reason of the wear of the lock or back end of the knuckle. We must limit the thickness of the tongue of the knuckle in wear, the amount of work in the knuckle pivot and pivot pin. All of those points are vitally important if we are going to keep our couplers in shape to keep the cars coupled together surely and safely. But one thing especially—I hope the Association, as I said before, will have a permanent committee on this subject of couplers that can keep in touch with the subject from year to year.

MR. LEEDS: Mr. President, I move that this blue print be embodied as a cut in our Proceedings, so that we can all study the points, and also that Mr. Waitt be requested to prepare diagrams of these gauges that relate to the limits that he speaks of, so that there will be clearly set forth not only the defects that have occurred, but the provisions he would suggest being made to prevent the recurrence of such accidents as he refers to.

MR. WAITT: Mr. Chairman, I would say, if the motion is seconded, that a drawing could be prepared, if it is wanted to be published in the report, showing the gauges that we have used and the way they are to be used. The limits that we have set on the Lake Shore may not possibly be the wisest ones. They are merely being put in use for trial. I can say this much, that it has necessitated in passenger equipment cars the removal of quite a number of knuckles, and in one or two cases, I believe, of couplers themselves, and it stopped some of the cases of uncoupling in passenger trains. We have not applied it to freight yet, because we wanted to try the thing thoroughly. But I think, so far as setting any limits is concerned, it is a matter that should have careful committee consideration, and the sentiment and experience of the members at large. But if it is wanted, a drawing of the gauge that we are trying can be furnished, and I would be glad to do it.

MR. LEEDS: Exactly the point that I wanted to make in this matter is that Mr. Waitt's remarks should be embodied in our Proceedings, and that in order to fully comprehend all that he has said we should have diagrams showing what he refers to, not only that we may study it up ourselves at our leisure and without taking up the time of this convention, but that from the study of it we will all be better prepared to make suggestions to the committee that I hope will be appointed in conformity with his suggestion. The motion I made was that the blue print that he has presented, and which he says he wishes every member of the Association could see, shall be printed in our Proceedings, and also that the gauges referred to be illustrated. I would say for the benefit of the President that the motion was seconded.

MR. CLOUD: The motion is that Mr. Waitt's remarks be illustrated by a cut of the diagram he had in his hands, and with a cut of the gauge or gauges he referred to, with the limits followed by the Lake Shore & Michigan Southern road.

THE PRESIDENT: You have heard the motion. Are you ready for the question? All in favor please say "aye"; contrary, "no."

The motion was carried.

Mr. Waitt subsequently furnished the following:

Fig. 1 shows a simple test gauge which we are experimenting with at the present time, for determining when the wear in a coupler is so excessive as to allow the knuckle to open when locked to a dangerous extent. The part of the gauge between the points A and B corresponds with the standard contour line of the inner face of

the coupler. Point C is intended to be on the line with the center line of coupler. The length of the arm C D is such as to permit of an opening of the knuckle through wear, or from bending, or other cause, of $\frac{3}{4}$ inch beyond the normal.

Our practice in using this gauge on passenger trains was to first pull the knuckle open as far as it would go in its proper locked position, then place the gauge against

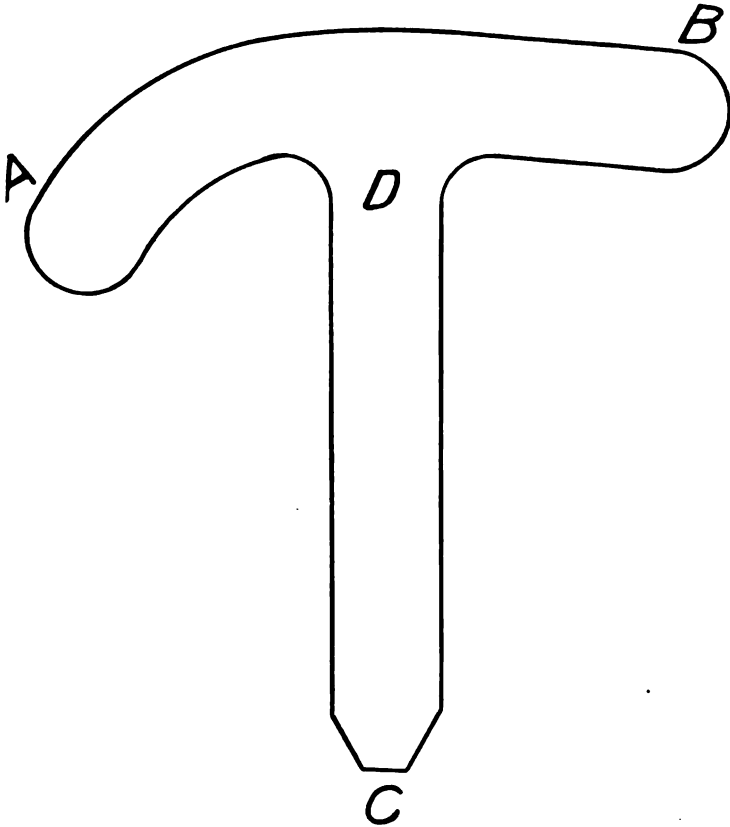


FIG. 1.

the face of the coupler close to the top lug, dropping it down between the knuckle and face of coupler. If the position of the knuckle is such as to allow the gauge to drop down inside of the knuckle, it indicates an excessive wear of one or more of the following parts: pivot pin; knuckle (pivot pin hole, inside of lugs or tongue); lock; coupler body (pivot pin hole). Our instructions are that the renewals of parts should be made in the order above named, and a sufficient number of parts should be renewed to prevent the gauge being inserted between the knuckle and coupler.

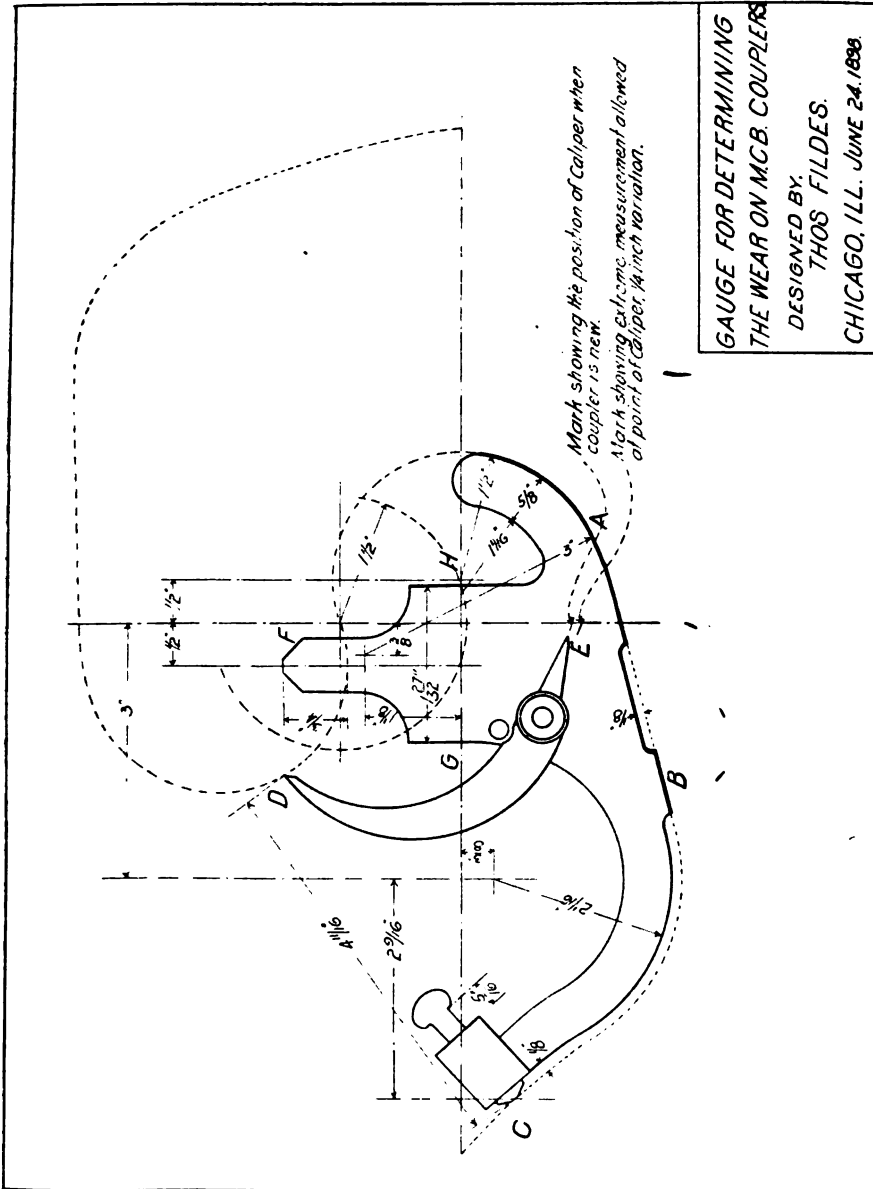


Fig. 2.

Some little experience with this gauge has shown that it cuts out quite a number of defective knuckles, and to that extent seems to reduce the troubles that we have had from uncoupling; but we find that it does not take in enough of the contour line of the face of the coupler to make it entirely accurate. Furthermore, it does not provide for the guard arm being bent or out of its proper position, and it does not provide for maintaining a safe proper distance between the nearest points of knuckle and guard arm.

As one of a committee of our Master Car Builders to consider the subject of limit gauges, and to recommend a suitable gauge for the purpose, Mr. Thomas Fildes, our Master Car Builder at Chicago, has devised a simple and seemingly very complete gauge, which is not patented, and which is submitted for the information of the members of the Association with a view of developing from this a practical limit gauge for wear on couplers. The gauge is illustrated in Fig. 2. This gauge is made so that when the caliper is properly set, the bearing points A, B, C and D can be made to correspond with the correct contour line, as shown by the M. C. B. gauge. At point E are two marks on the gauge; when the pointer of the caliper arm points to one of them, the gauge is set in accordance with the standard contour lines; when the pointer points to the other, and the gauge with the caliper so set passes down between the knuckle and the guard arm, it shows that there is an excessive wear, the mark being made at the limiting point determined on for allowable wear. This wear thus indicated shows that it exists either in the knuckle pin or holes in the knuckle, or lugs of the coupler. If the movable slide at C, which has a free movement of $\frac{5}{8}$ inch, goes to its extended position, it indicates that the guard arm is sprung so much that it has become dangerous, and the coupler body should be removed. The maximum distance over all at the points C D should not exceed $5\frac{1}{4}$ inches, and whenever the coupler becomes worn so as to permit that distance it should then be condemned. The remedy then would be either to apply a new knuckle, a new knuckle pin, or to bush the holes for the knuckle pin so as to take up the excessive play. The projecting point F on the gauge is for preventing excessive wear in knuckle or coupler, which will permit the knuckle to open up when locked $\frac{3}{4}$ inch beyond its normal position. This we consider is the maximum distance allowable in safe practice.

It will be noted that the part of the gauge on the line G H is straight; this is made $1\frac{3}{4}$ inches, and is to be used for gauging the hole in the knuckle and the holes in the lug of coupler, and when worn to the limit shown it indicates that they should be bushed or renewed. The distance is given for the Gould coupler, which is our standard, and which uses the largest size of knuckle pin of any of the couplers.

This large gauge that I have illustrated and described is merely a suggestion that seems to be in line with what we want to get at, and it may be a starting point from which a standard limit gauge can be derived.

Yours truly,

A. M. WAITT, *Gen. M. C. B.*

MR. BLACKALL: Mr. President, if in order, we are ready to report on the nominations.

The committee has nominated for President, C. A. Schroyer; for First Vice-President, John T. Chamberlain; for Second Vice-Presi-

dent, J. J. Hennessey ; for Third Vice-President, W. J. Robertson ; for Executive Committee, E. D. Bronner, J. H. McConnell, William Apps ; for Treasurer, G. W. Demarest.

Mr. E. D. Bronner declined the nomination for President.

MR. E. D. BRONNER here took the chair, and said : The special order of business at this hour, gentlemen, will be the revision of the Code of Interchange Rules. If there is no objection, the usual course will be pursued — that is, the Secretary will read the rules, section by section, and if there is no question raised the section will be allowed to stand. The Arbitration Committee, of course, will present its recommendations at the proper time.

MR. RHODES : I would suggest that in place of the Secretary reading the entire section he only read the number of the rule and the number of the section, and then pass on, if there is no question raised.

MR. CLOUD : We have here a lot of the copies of the Rules of Interchange, and copies of the reports of the Arbitration Committee, which will be distributed.

THE CHAIRMAN : Before we proceed, I would like to call the attention of the gentleman who is acting as chairman of the Committee on Prices in the Master Car Builders' Rules, Mr. McConnell, to bring the recommendations up at the proper time.

The convention then proceeded to revise the Rules of Interchange.

Section 20 of Rule 5 having been reached, Mr. McConnell said : If it is proper at this time I would like to bring up the question of additional compensation for work done by roads west of the 105th meridian. There are a number of representatives here from the Western roads, and it might be of interest to the convention to have them get up and state their position.

THE PRESIDENT : Is there anybody in the convention who wishes to speak on this question ?

MR. HICKEY : Mr. Chairman, I will suggest that this question be deferred until the end of the adjustment of the Interchange Rules. Let the details of what we are now handling proceed until the end, after which the question of additional compensation, brought up by Mr. McConnell, can be taken up in better shape.

THE PRESIDENT : There is no motion before the house, and we will proceed to —

MR. MCCONNELL: I suggest, then, that Mr. Hickey make that in the form of a motion — that this matter be brought up at some specified time — the compensation to Western roads; and that will give everybody interested in the Western lines an opportunity to come here and be prepared to present their side of it in the convention. I would ask Mr. Hickey to put that in the form of a motion.

MR. HICKEY: I cannot see that it would better the situation any to fix a specified time. I would say that when the question of the Interchange Rules is done with, we could then take it up to advantage, because there are matters and items in this adjustment which we are now going through with that may have some bearing on the question of additional compensation. I do not see that a motion is necessary. If you like, and if I am in order, I will move, that it be deferred until the Interchange Rules are adjusted.

MR. MCCONNELL: I would say in that connection that if this matter is deferred to the latter end of the session, possibly we will get tired and a number of the Western representatives may be away, and I do not think the subject will be ventilated to the justice of the convention or the Western members.

MR. SMALL: As representing one of the Western railroads, I understand that a committee was appointed for the purpose of considering and presenting recommendations to the Association. I furnished the committee with all the information I could, showing the amounts it cost us to repair cars. But I do not see that the committee has made any recommendations to the Association. We are in about the same shape now that we were last year. I would like to hear from the chairman of the committee as to what he would recommend, judging from the information he received from the Western roads. I know our road recommended that they should receive fifteen per cent above the regular M. C. B. prices.

MR. CHAMBERLAIN: I believe about as good a time as any to settle this question is now, for the reason that we have got a good, full meeting here — about as full, probably, as we will get. If my friend here will make a motion bringing up this question at a stated time, I do not see any objection to it; but I do not believe you will get a better meeting than you have got now to handle the subject. As far as the prices are concerned, whatever the Committee on Prices has to further recommend does not, so far as I can see, make any difference with the principle of the question, as to whether the roads west of the 105th meridian should charge a percentage for labor

and material over that allowed to be charged by the Eastern roads. The principle is right there. The arguments can be made pro and con and the subject can be discussed, and I would prefer to have it discussed now. I would make a motion, Mr. Chairman, that the matter be taken under consideration now. •

MR. SCHROYER: I rise to a point of order. What are we talking about?

THE PRESIDENT: Mr. Hickey's motion. Your motion was seconded, wasn't it, Mr. Hickey?

MR. HICKEY: I made a motion that the subject be deferred until we get to the end of the Interchange Rules. I do not know whether it was seconded.

A MEMBER: I second that motion.

MR. HUMPHREY: I would like to say that I concur with Mr. Chamberlain that now is the proper time to take this up. The Western members are all here. After adopting all these different sections it will be necessary, perhaps, to reconsider some of them if we adjust any of the rates as some of the Western members desire to request. I move to amend that we proceed to consider this question right now. (Seconded.)

MR. HICKEY: If it is the desire of the members that that be done I withdraw my motion in favor of Mr. Humphrey's.

MR. LEEDS: I agree that the time to discuss that is now, and we would have been at that point now if the motion had prevailed that we take it up on the conclusion of the revision of the Interchange Rules. We have wasted a great deal more time than it would have taken to finish the Rules. I make a motion, as I understand Mr. Hickey has withdrawn his, that we proceed with the Interchange Rules to a finish and immediately take up the discussion of the extra compensation.

THE CHAIRMAN: The motion before the house is Mr. Chamberlain's motion, which was seconded by Mr. Humphrey, that we proceed at once to consider the question of extra compensation for the Western roads.

MR. LEEDS: Excuse me. I did not know there was a motion before the house.

THE CHAIRMAN: All in favor of the motion will please say "aye"; contrary, "no."

The motion was carried.

The report of the committee is as follows :

REPORT OF COMMITTEE ON PRICES IN MASTER CAR
BUILDERS' RULES.

To the President and Members of the Master Car Builders' Association :

Your Committee on Prices in Master Car Builders' Rules begs leave to submit the following: A circular of inquiry was sent out asking for certain information that would enable the committee to present to the Association certain facts connected with the operation of cars on Eastern and Western roads. Thirty-one replies have been received. The Arbitration Committee has furnished this committee with suggestions from the several railway clubs and members of the Association. The tendency to increase the size of freight equipment in the last few years has put in service a number of cars of 70,000, 80,000 and 100,000 pounds capacity, and also increased the length of furniture and stock cars. During the year 1897 a number of furniture cars fifty feet over end sills have been built and this year stock cars forty-two feet long have been placed in service. The present Master Car Builders' prices do not include axles for cars above 60,000 pounds capacity.

Various forms of metal trucks are being used; several kinds of pressed steel, others of cast steel and combinations of iron and steel are in service. There should be a price made by the Association to cover the loss on the bodies and trucks of the modern equipment now being built and in service.

The following letter from the Arbitration Committee has a number of suggestions and the letter is given in full :

Some suggestions for changes in the prices in the Rules of Interchange having been sent to the Arbitration Committee in response to its circular asking for suggestions for the revision of the Rules of Interchange, the committee has instructed me to communicate to you these suggestions about prices, because they properly belong to your Committee on Prices in the Rules. They are as follows :

The Northwest Railway Club recommends that the prices of axles be extended to include axles for 70,000, 80,000 and 100,000 pound cars.

Mr. H. J. Small suggests adding to the prices for end and side doors applied, "No credit to be allowed," or "that a fixed credit be quoted for doors lost when cost of replacing same is charged to the owner."

The Western and St. Louis Railway clubs advise that the word "brass" be inserted between "filled" and "shell" in the fifth line on page 24, while the Central Railway Club advises that the words "brass or bronze" be inserted in the same place.

In regard to Section 17, Rule 5, the following suggestions have been made :

By Mr. G. L. Potter.

In the list of charges for labor as shown on page 27, strike out the fourth item, "draft timber bolts complete, at one end of car, replacing," and substitute "draft timber bolts renewed, each 5 cents for ordinary cars and 5 cents for refrigerator cars."

We would suggest that the following additional items be included in the list referred to :

One side plank replaced for gondola cars.

Two side planks replaced for gondola cars.

Three side planks replaced for gondola cars.

One end plank replaced for gondola cars.

Two end planks replaced for gondola cars.

Three end planks replaced for gondola cars.

One side plate spliced, 6 hours ordinary cars, 15 hours refrigerator cars.

One side plate applied, 6 hours ordinary cars, 6 hours refrigerator cars.

One running board applied, 6 hours ordinary cars, 6 hours refrigerator cars.

One metal brake beam repaired, 3 hours ordinary cars, 3 hours refrigerator cars.

By Mr. Jno. Hodge.

That table be amended to include the item "side plate," the number of hours to be charged for replacing or splicing; also to designate where it may be spliced, similar to Section 8, Rule 4.

By Central Railway Club.

Add to the table the following:

Side plate spliced, 8 hours for ordinary cars, 15 hours for refrigerator cars.

Side plate applied, 15 hours for ordinary cars, 25 hours for refrigerator cars.

Running board complete, applied, 6 hours for ordinary cars, 6 hours for refrigerator cars.

By St. Louis Railway Club.

Add to table:

One side plate, ordinary cars, 25 hours; refrigerator cars, 40 hours.

One side plate, splicing, ordinary cars, 15 hours; refrigerator cars, 25 hours.

Western Railway Club concurs in suggestions of Central Railway Club as above; also suggests note as follows:

NOTE.—When center plate bolts are renewed, no extra charge for labor shall be made for applying the center pin or friction rollers to same end of cars.

Car Foremen's Association.

Add to table on page 28:

Applying one side plate, ordinary car, 20 hours; refrigerator car, 35 hours.

Splicing one side plate, ordinary car, 10 hours; refrigerator car, 20 hours.

Section 18, Rule 5.

The Central Railway Club suggests that we add the following: "Renew pipe nipple on end of train pipe, 5 cents."

The Arbitration Committee suggests for your committee that prices to be charged for each item of material mentioned in this section should be inserted in the table.

Section 19, Rule 5.

The Northwest Railway Club suggests that the prices of cars should be extended to include box and furniture cars 40 feet long or over, but under 46 feet, and 46 feet or over, but under 50 feet.

The Pennsylvania Railroad Company suggests that gondola cars of 40 and 50 tons capacity should be included in these prices for gondola cars.

The Pennsylvania Railroad Company also suggests that under the head of "Trucks" should be included prices for pressed steel trucks and trucks of 80,000 and 100,000 pounds capacity.

The question of additional compensation for work done by roads west of the 105th meridian has been before the Association several times. Information from seven Western roads shows the average wages paid for labor on car repairs to be 23⁶/₁₀ cents per hour, while the average for same class of labor on Eastern roads is

18 cents per hour. The Western roads pay 31 per cent more on an average than Eastern roads for labor and the Western roads claim material costs an average of 10 per cent more than prices paid by Eastern roads.

Seven Western roads paid to Eastern roads for repairs of cars \$69,621.78. They collected from Eastern roads \$132,909.25 for repairs to Eastern cars on the seven Western roads.

From statements from the Western roads as to prices paid for labor and material, the actual cost to the Western roads for doing the work was \$159,491.10, showing a loss to the seven Western roads for the year 1897 of \$26,581.85.

If the amount collected from Eastern roads was equal to amount paid by Western roads, the loss would be less, from the fact that the Western cars were repaired East cheaper than West, owing to less cost for labor and material. The difference would then be against the Western lines, \$12,657.49.

This has allowed the Eastern roads the benefit of less cost for the work and given the Western roads credit for difference in cost of repairs at the lower rate.

The information furnished your committee by the Western roads as to additional compensation for car repairs west of the 105th meridian, does not justify the committee in making any recommendation, believing it best to report such facts as they have been able to obtain to the Convention for its consideration.

Your committee would recommend the following change in prices :

Axles for 70,000 and 80,000 pound capacity cars, \$12.

Axles for 100,000 pound capacity cars, \$14.

Add words "no credit for scrap," in connection with price of side and end doors applied, on page 23.

Insert word "brass" or "bronze" between "filled" and "shell," on page 24.

Add to table on page 28 :

Renewing one side plank, gondola cars, 4 hours.

Renewing two side planks, gondola cars, 5½ hours.

Renewing three side planks, gondola cars, 7 hours.

Renewing one end plank, gondola cars, 2 hours.

Renewing two end planks, gondola cars, 2½ hours.

Renewing three end planks, gondola cars, 3 hours.

One side plate applied, ordinary cars, 15 hours; refrigerator cars, 25 hours.

One side plate spliced, ordinary cars, 8 hours; refrigerator cars, 15 hours.

One running board complete, applied, ordinary cars, 6 hours; refrigerator cars, 6 hours.

Add to table, page 28 :

Head center pins applied, empty cars, ½ hour; loaded cars, 3 hours.

Key center pins applied, empty cars, 1½ hours; loaded cars, 1½ hours.

Add to table, page 29 :

Renew pipe nipple on end of train pipe, 5 cents.

In regard to the prices of larger cars than mentioned in the rules, the committee believes that Sec. 21 of Rule 5 covers furniture cars 40 feet long or over, properly; and it recommends, in regard to gondolas, that the following words be added to the first drop bottom and the first hopper bottom gondola mentioned in the table, viz: "but under 40 tons." Sec. 21 will then also properly cover gondola cars of 40 tons capacity and over.

Add to footnote on page 28, "No additional labor to be charged for applying center pin or friction rollers when center plate bolts or center plates are renewed on same end of car."

Add to table on page 23:

Air-brake hose coupling renewed, 80 cents; no credit or scrap.

On page 31 substitute for prices of trucks the following:

TRUCKS, PER PAIR.

CAPACITY.	Wooden Transoms.	Metal Transoms.	Pressed Steel.
60,000-lb. cars or under	\$200.00	\$225.00	\$250.00
80,000-lb. cars or under, but over 60,000 lbs.	225.00	250.00	275.00
100,000-lb. cars or under, but over 80,000 lbs.	250.00	275.00	300.00

Prices include brake beams complete, truck levers and bottom connection rod.

J. H. McCONNELL,

J. J. HENNESSEY,

S. P. BUSH,

T. B. PURVES, JR.,

S. A. CHARPIOT,

Committee.

THE CHAIRMAN: Now, is there anybody who wishes to speak on that subject?

MR. HUMPHREY: In order to bring this formally before the convention, I will simply renew the motion that was made last year, and then any of the members who wish to debate the question can debate it pro and con; that is, that fifteen per cent be added to all work done west of the 105th meridian. (Seconded.)

THE PRESIDENT: It has been moved and seconded that an arbitrary percentage — fifteen per cent — be added to the prices for all work done by railroads west of the 105th meridian. Are you ready for the question?

MR. SCHROYER: I would amend that motion, Mr. Chairman, by an addition of ten per cent to be added to all labor charges on the repairs of cars between Lake Michigan and the 105th meridian. (Seconded.) I want to say that we have just as good grounds for making this demand as the Western members have for making theirs. We pay more salary than you Eastern people do, and it costs us more money to do our work. While it is true that we are handling your cars at the rate of six-tenths of a cent a mile, you are maintaining

those cars at home for less money than we are maintaining your cars on our line. They are operating cars on the Western lines for six-tenths of a cent a mile, and we are paying for the maintenance of the cars while there. While it costs them probably more to do repairs than it costs us, yet I question very much, from the aggregate of their figures, whether it costs a great deal more. But I think if you are going to discriminate in favor of some of us you should let the balance of us get a chance at it.

MR. MCCONNELL: Mr. Chairman, when you go east of the Missouri River you begin to decrease in the price paid for labor. The price for labor for car repairers, carpenters and laborers on the Eastern roads averages about 18 cents an hour. West of the Missouri River it amounts to about 23.6 cents an hour. The cars that are repaired on the Eastern lines are repaired at a profit; on the Western lines they are repaired at a loss. The labor charge is nearly thirty-one per cent greater on the Western lines than it is on the Eastern lines. The cost of material is ten per cent, and in a number of cases it is fifteen per cent, more. Take the price of wheels: you can buy wheels in the Eastern country here for \$4.25, \$5, \$5.50, and in the Western States they cost as high as \$8.25 apiece, and the same applies to manufactured articles and material that has to come from the East. While that is true of hardwood lumber, it is not true of softwood lumber. The Western country is supplied with Oregon fir and with Oregon pine, which is largely used in car construction, but the oak and other material that comes from the Eastern States is at a much higher price than that paid by the lines east of the Missouri River. I have some figures here to show the difference between the amount of money expended for car repairs to Eastern cars on Western lines and that expended on Eastern lines in repairing Western cars, and it is largely against the Western lines. Take, for instance, the Colorado Midland. On the question of foreign mileage it is a little against that line, and the Colorado Midland paid \$17,000 for their cars repaired on foreign lines, and they collected \$27,000 for repairs of foreign cars made on their own line. Their foreign mileage was two millions, and the mileage made by the foreign cars on their lines was four millions. On the Southern Pacific road they collected from foreign companies \$32,000, and they paid out \$10,000. On the Union Pacific we paid \$28,000 for foreign car repairs, and we collected from foreign lines \$45,000. The Rio Grande Western collected from foreign lines \$10,000, and paid out \$7,500. The

U. P. D. & G. collected \$14,226, and paid out \$5,495. That same thing prevails on all of the Western roads, that the amount of money expended for repairs to foreign cars is largely in excess of the amount of money that they pay out to Eastern lines for repairs of their own cars. The mileage of foreign cars on the Western roads is largely in excess of the mileage of the Western cars on the Eastern roads, and in view of the fact that there is such a difference in the price of labor and material, and the fact that the cost is so much against the Western roads for the amount of money expended in car repairs, I think there should be a difference in favor of the Western roads in what they are allowed to charge. Now, the representatives here of the Western roads, a number of them, can give you the facts, I think, in dollars and cents as to what they pay out for labor and what their price is for the different classes of material.

MR. GARSTANG : If I understood Mr. McConnell right, the Union Pacific paid out \$28,000 and collected \$45,000. I think it would be interesting to know what the foreign mileage was on that road, and the mileage of U. P. cars on foreign roads, so that we can get at some idea as to how it was on a mileage basis.

MR. MCCONNELL : The Union Pacific cars made 41,226,483 miles on foreign lines, and foreign cars made on the Union Pacific road 79,537,917 miles. The Union Pacific paid out for foreign car mileage \$508,942, and they collected for Union Pacific cars on foreign roads \$248,985.

MR. BUSH : Mr. Chairman, as a member of the Committee on Prices, I am personally very sorry indeed that the committee has not been able to make a report covering this entire subject. Most of the members of the Association know that the chairman of the committee, Mr. J. N. Barr, has been very seriously ill for a long time, and has not been able to do any work with the committee, and at the last hour Mr. McConnell was appointed chairman, and he did the very best he could to get some information together to make a report, and the fact that the time was so limited was one of the reasons why a good many of the questions arising here in the convention have arisen in regard to prices. I was very much in hope that this question of differentials might be discussed and presented by the committee in a thoroughly comprehensive way, because it is a question that involves a very important principle, and I believe it is by far the most important thing that the convention has before it at this meeting. There are two factors to be taken into consideration in this question. It is not

fair to consider only one. One is the question of repairs — the cost of repairs, and the other is the question of mileage, and they go hand in hand. Now, of course, so far as the car builders are concerned, or so far as the motive power department, or anyone having charge of the equipment is concerned, they are naturally apt to look at the question of the repair side and the cost to their department, and take no account of the cost of mileage. Now, it is not fair to look at it that way. The fact of the matter is this, that we have an average mileage rate for ordinary freight cars which covers the entire country. That rate is 6 mills per mile, an exceedingly low rate. If you take the average value of a car—the cost—at say \$400, the interest on that is \$24. The average mileage of a freight car on twenty-three of the principal roads of the United States is twenty-one miles per day. That gives a mileage of 7,560 miles a year. The return, at the rate of 6 mills per mile, is \$45.36 to the owner. Out of that he has got to pay for the cost of maintenance, and included in the cost of maintenance is the item of depreciation, which means the renewal of cars that are worn out. Now, at the very lowest, 4 mills per mile will be the cost, and in a great majority of the roads of the country I am satisfied that it will run over 5 mills as the actual cost of maintaining the equipment. That includes renewals of cars that are made vacant by being destroyed for various reasons. Assuming that it is 4 mills for maintenance, that will be \$30.24 per car per year. Deduct that from the revenue received from the car of \$45, and you have fifteen dollars and some odd cents as the return on your investment. Now, the railroads west of the 105th meridian are getting the benefit of that exceedingly low mileage rate. As Mr. McConnell shows by his figures, they are using a great many more foreign cars — the foreign mileage on their roads is much greater than the mileage of their cars on Eastern roads, and he and all the others in that section of the country are getting the benefit of that exceedingly low mileage rate, which, I claim, compensates for any difference in the cost of making repairs, and even if it did not, they would have to have their own equipment to do the business that they are doing today. They would have to pay exactly the same amount of money out, and a great deal more for maintaining their own equipment than they are paying foreign roads today. In addition to that they could not possibly get a fair return on their investment. The fact of the matter is, I believe, that the Western roads are away ahead on account of being able to rent cars at such a low mileage rate, and I think that in view of those

circumstances the question of a differential in favor of any section becomes another matter, and I cannot bring myself to believe that it is in any way just. I think the matter ought to be settled entirely on the basis of what is just. [Applause.]

MR. SCHLACKS: I cannot agree with what Mr. Bush has had to say in regard to the Western roads being ahead. We are sent here by the machinery department of these Western roads. Now, if the material and labor as we have shown here are higher and cost so much more money, I cannot see the force of the argument of Mr. Bush in saying that we are ahead. We have shown by figures here that we are running behind, in doing other people's work on cars. How can we be ahead? We show here that our expense is very nearly 31 per cent more to keep foreign cars in repair than what it is East. Consequently I cannot understand the argument that we are still ahead. For every dollar we spend on foreign cars we are just that much out, as labor and material are higher than they are in the East.

MR. HUMPHREY: As I understand the principle of this organization, Mr. Chairman, its fundamental principles are the laws of reciprocity, or the spirit of reciprocity. Now as soon as we find that the rules do not treat all alike, then I think it is the duty of this organization to take into consideration the facts, and try to adjust those rules to meet all conditions. We find other departments of railways, such as the traffic department, meeting and adopting differentials that meet all sections of the country, and still we come here and claim to be business representatives of the railroads of all sections of the country, and when we present facts and figures showing that we are operating at a loss in a certain section of the country, and that there are hardships being worked, then we are met with the proposition, or with the suggestion, that we are doing very well indeed, and that we are really making a profit, when the figures show everything to the contrary. Now, gentlemen, what we ask of you at this time is justice — is a due consideration of these facts. This question is of deep import to the Western members. It is something that is attracting the attention of those beyond the mechanical department. As I said to the convention a year ago, we have others to account to, and when we receive cars on Western lines, and especially I might say the cars of private lines, that surely are making a profit out of those cars that are transporting freight throughout the country — if they were not making a profit in the handling of those cars, they would not be in the business — when we accept those cars for transport all over the

Western lines, and we show to you by facts and figures that cannot be denied that it costs us 31 per cent more to make the repairs than we get for the repairs, is there any just argument to show that we should not have that 31 per cent? We do not ask for all of it, but we do say that we think we should be recompensed for one-half of our loss. Just as an illustration: We will receive a private car line on one of the Western roads. In transporting it over the mountain the wheels break. We apply a pair of wheels that cost us, we will say — as is the case in some places on the Southern Pacific lines — as high as \$8.70, as I understand, for which they only receive \$6.50 — \$2.30 loss on one pair of wheels in transporting that car of freight over the line. Perhaps if the exact amount was figured out they did not receive enough for transporting that car through what they received of the freight to pay for the repairs that they put on. Now, after we had made those repairs it was not possible for us to receive in the way of reciprocity any return whatever from that private line, but we had to accept the car when it was returned to us the next time, and make the same repairs. Now, if we were operating entirely on an interchange between the different railroad companies, we would be more content to let this question continue as it has been, but as long as the managements of the Western lines have to pay for the independent cars the rates that they charge, when they are tendered to us at our connecting points, we are in duty bound to receive the cars or transfer them. We cannot transfer the freight and do justice to our connecting lines. Therefore we are compelled to take those cars and make the repairs at a loss, and deliver them to our Western connections, which experience the same thing as the middle roads do. Now, we do not ask for a cent of profit. The suggestion has been made that you draw an intermediate line between the East and the West. I will say that if they can show that they are repairing cars at a loss they should do it. But the figures presented do not show that they are repairing these cars at a loss. They are making a profit. Where the Western lines show that they are paying as high as \$2.60 for labor, the Eastern and the middle roads show that they are getting their labor for \$1.80 for ten hours, or 18 cents an hour. That being the case, is there any just argument, when material comes the same, why there should be a dividing point in the intermediate territory? I think not, unless they can show where there is a hardship being worked. As I said before, I do not believe it is the intention of any section of the country to lose money by making

these repairs. If we are not to lose money by making the repairs, let us get down to the figures; let us take the figures as presented, which I think everyone will agree are authentic, and arrive at a better basis, which can easily be done, and then we will do lots to promote and guarantee the perpetuity of this institution which stands today the highest of any organization. But I am sorry to say, and I believe that everyone of the Western representatives will say to you candidly, if we cannot go back to our managers and say we met with some concession from this body, that they will begin to think that our trips are more of a junketing nature and of a pleasure trip than they are of a business nature. Now, we, as representatives of the mechanical department, know that that is not true. We have been met with fairness on every proposition but this one, and when it comes to adjusting this I hope that the members, the different members individually, will look at it with a magnanimous spirit, and let us go home and say that we have accomplished something in this line, and then I am sure that the future of this institution, so far as this broad land from the East to the West is concerned, will be won. [Applause.]

MR. LEEDS: I think that the first statement made that it should be reciprocal is very fair; but I would as soon think of asking them to share in our malaria as against their salubrious climate and exhilarating spirits and health, as to expect that they should ask us to employ their labor at their exorbitant rates, other things being equal; and it is equal from the fact that they do get the same mileage rates that we do. Now, if the interchange of cars were exactly equal, then it would be to their advantage always to keep their cars in our territory, and decidedly to our disadvantage to keep them in theirs. Consequently there is no reciprocity in it. If we are to pay fifteen per cent more for repairs to cars than we receive for repairs of same nature, they would get the full benefit. If their cars made the same mileage on Eastern roads and received the same repairs as Eastern cars on Western roads, then cars would be repaired so much cheaper East than they can repair them themselves that it would fully offset the extraordinary expense that they are put to in repairing Eastern cars. Now, then, it costs very close to every cent that we get for mileage to keep our cars in repair and perpetuate them. If you add the six per cent that anyone should have on such property as that, where they are liable to loss, then it does cost fully all that we get to perpetuate equipment, to replace every car that is destroyed and

goes out of existence due to age and decay, to keep up our repairs; it costs fully the 6 mills that we receive to so maintain equipment, allowing that we get our six per cent on the original cost. Now, then, if we are giving the benefit of the use of our cars at exactly or very nearly what it costs us to maintain them, there is no reason why we should go to a greater expense to maintain those cars for their use, and it is shown by the mileage that we are perpetuating and equipping cars for their use, and the greater balance in the actual cost, not per mile but on the gross expenses, is pretty well accounted for by the mileage. It is a fact that they pay more for wages, but is there any reason why we should repay those wages? Are we responsible in any way for the conditions that make those wages higher? It is an undoubted fact that with those conditions before them their competition is not such but that they get a better rate per mile for their tonnage. [Applause.]

MR. HICKEY : About a year and a quarter ago, when I connected myself with a Western line, I was very much struck with the prices of the material and labor that were being put into the repairs of freight cars. To ascertain where we stood and how we would come out as to expenses, I addressed a note to Mr. Small, of the Central Pacific, Mr. McConnell, of the Union Pacific, and Mr. Humphrey, of the Colorado Midland, Mr. Egan, of the Denver & Gulf, Mr. Henry Schlacks, of the D. & R. G., Mr. Dunn, of the Oregon Short Line, and others. The replies were a unit in saying that they were losers in labor and material and in scrap prices allowed by the M. C. B. rules anywhere from eighteen to forty-five per cent, and in one case it was more than forty-five per cent. Now, the attention of our general managers on several Western roads was called to that fact. They got together and talked over the question of the propriety and justice of the M. C. B. rules. In fact the question of seceding from the rules or from the regular Interchange Rules of the Association was talked of. Of course, the mechanical people would discourage that. Nevertheless, I mention that to show the seriousness of this question. Now, I am not going to take the time of the convention, as you are getting tired, and as this matter has been fully discussed by other gentlemen here, and perhaps others want to discuss it; but I want to read for you just a few items—a ten-day transaction for the month of March of this year in the repairs of foreign equipment. We used for ten days 2,797 pounds of cast iron. The cost of that to our company was \$55.95, and its application. The cost permitted

by the M. C. B. rules was \$41.96, a loss to our company of \$13.99 in that one transaction. Now, we used of brass 2,397 pounds, at a total cost to our company of \$281.65. The amount allowed by the M. C. B. rules to us is \$263.67, or a loss to our company of \$17.98. On the question of hardwood, oak especially, we used 500½ feet, which cost us \$22.57. Allowed by the M. C. B. rules \$12.54 — a loss to our company of \$10.03. We used twenty wheels, at a cost to us of \$7.10 each, and that was a very low figure; they are more now. That was a total cost to us of \$142. Allowed by the M. C. B. rules \$130, or a loss to our company of \$12. Without going into the further particulars of this matter, gentlemen, I want to say that in a total transaction of \$1,047.01 actual cost to our company, we were allowed by the M. C. B. rules \$941.41, or a loss of \$105.60, in ten days. I can go along the whole year round and show you even worse figures than that, but I take this as a medium, and I cannot think of any argument which can be produced to justify this Association in denying to the Western roads a reasonable rate for the repairs to foreign cars. To say that the Association does not desire to permit differentials to prevail, is saying that they desire not to be honest. That is the way I look at the matter. In fairness to our companies, in justice to the individual members of this Association, and as a matter of common honesty to the Association, they should permit differential rates and we should have not less than fifteen per cent added to the price of labor and material in favor of roads west of the 105th meridian. [Applause.]

MR. GARSTANG: Mr. Chairman, referring to the figures that were presented by Mr. McConnell, of the Union Pacific, if I understood him correctly, he claimed to have paid out \$28,000 and collected \$45,000 for car repairs. He claimed also that their cars made forty-one million miles on foreign roads, and foreign cars made seventy-nine million on his road. He collected 60 per cent more money than he paid out and received 90 per cent more foreign car mileage on his road than the mileage made by his cars on foreign roads. In view of these figures I do not see where the Western roads are losing anything. [Applause.]

MR. MACKENZIE: It is nearly half-past one now, and I think we ought to adjourn. A number of us here have ladies who are waiting for us in order to go to dinner. I suggest that when we do adjourn it be to meet here at three o'clock and take up the question further. (Seconded.)

MR. MORRIS : I approve of the suggestion of Mr. Mackenzie.

MR. MACKENZIE : I make a motion that we adjourn now until three o'clock.

MR. CLOUD : Before the adjournment I have an announcement I would like to make. Mr. Mitchell says : " Please announce that the Committee on Stenciling Light Weight on Cars will meet at three o'clock in the writing room of the Grand Union Hotel."

The convention then adjourned until 3 P.M.

AFTERNOON SESSION.

The convention was called to order at 3:15 P.M.

THE CHAIRMAN : Before we proceed to a consideration of the rules, the Secretary has some announcements.

MR. CLOUD : The Chairman has appointed a Committee on Correspondence and Resolutions, to report about the close of this convention — Messrs. Appleyard, Hickey and Atterbury.

Mr. McConnell requests that the Committee on Prices meet in the writing room of the Grand Union Hotel at 6:30 this evening, to consider the matters referred to it.

The New York, New Haven & Hartford Railroad Company has kindly sent to Saratoga a first-class passenger coach which has been finished on the exterior with sheet copper. The car is standing just across the tracks from the station. There has also been sent by the same company for inspection one of their baggage cars fitted with a series of removable horse stalls, which has proven an excellent device in service.

THE CHAIRMAN : The question on Mr. Humphrey's motion is now open for further discussion.

MR. SMALL : Referring to Mr. Humphrey's motion, there is one point I would draw attention to in the argument of the gentleman on the other side, and that is bringing in the matter of differentials of freight rates in connection with this question. It appears to me that this Association is here to discuss and legislate on matters of car repairs. I think that is the only way to look at it. It has been clearly demonstrated that the repairs of cars west of the 105th meridian are more costly than east of that. I have no doubt, if our traffic manager were here, he could clearly demonstrate that our company loses money on every ton of freight it hauls over the road in foreign

cars. I believe it myself, and I have no doubt that he could demonstrate it. Another point is that a large percentage of the cars handled on Western roads are private line cars. I think in discussing this matter it ought to be solely from the point of view of car repairs.

MR. LEEDS: I have a little something to say about this. I think it is very clear and evident that these gentlemen get the full benefit of the prices now in vogue according to their own showing as to mileage, number of cars repaired, or at least the amount of repairs made; they get as much of their own repairs made at the reduced prices as they in return make for us at the advanced price, and if the interchange was exactly the same they would have to make the same amount of repairs on their own cars at the advanced price as they now make on our cars, and they would not get any benefit on their own cars of the repairs that we make at the reduced price. Now, then, that is reciprocity, I think. But there is no reciprocity in regard to the repairs that are made on private line cars by them, and I think that it is no more than equitable that there should be a rule established that private line cars should pay a differential from the very fact that they do have repairs made at an increased cost, a cost in excess of what they have to reimburse these people for, and at the same time there is no possibility that they receive any advantage as they do in the interchange with railroads. If you will forgive me for what I have done, I will keep quiet after this.

MR. MCCONNELL: Mr. Chairman, I should like to correct a mistake that Mr. Leeds has made. Mr. Leeds is under the impression that the amount of money paid both ways for Eastern and Western lines is about equal. I think he is mistaken on that. The Western roads collected from the Eastern roads \$132,000 for repairs made to Eastern cars while on Western lines, while the cost for repairing the Western cars on Eastern lines was \$69,000. Now, there is a difference between \$69,000 and \$132,000. There is the difference; and I wish to say further that the business on the Western lines is done—forty-five per cent of all the business on the Western lines is done—on foreign cars. Now, that is not the fault of the Western lines, because they have cars of their own that lie idle while they are obliged to use cars from Eastern lines and private line cars to carry the traffic over the Western lines.

MR. LEEDS: I promised to keep quiet, but at the same time I cannot rest under a misunderstanding. I know that I tried to make

it clear that if the interchange was equal then they would get the advantage.

MR. MCCONNELL: Mr. Chairman, after hearing Mr. Leeds' explanation, I will forgive him.

MR. JOHNSON: Mr. Chairman, in connection with this question there are several points that enter into the subject that have been overlooked this morning. One of them is the movement of cars. A gentleman on the left this morning stated that the average mileage per car was 21 miles. Now, the figures are quite startling. To think that with trains running at the speed which we have today giving a possibility of nearly 200 miles per car, that they do not make but 21! Now, if you analyze the cause you find that the cars in the East move through a section of the country densely populated. They are used, to a greater or less extent, as storehouses for the commodities which they transport from point to point. Take that same car and let it leave Denver loaded, as it often is, for San Francisco, and what is the result? That car runs to its destination, possibly, without the loss of an hour, and where before it only made 100 miles it now makes 1,000. Is it not possible, under those conditions, that the wear and tear of that car is much in excess of what it would be were it only moved 20 miles? There is not a gentleman in the house but will say that such is the fact. Then, if that is the fact, it is natural to suppose that those handling that car have to make good that wear, where it is broken and must be repaired, and in being reimbursed for those repairs they are compelled to confine themselves to fixed prices that are established on the most economical basis that exists in the United States. It is a fact that what the East can do its work for is the principle that governs them in setting the prices of labor and material today for this Association. Everyone knows that. The consequence is that if they can do it for simply what it costs and lose nothing, they are satisfied, and every gentleman in his car department boasts that he has reduced the expenses so much per mile. At the same time, Mr. Chairman, he does not stop to think that the man who pays double salaries to his force and double the prices on material loses four times per mile, possibly ten times per mile, in proportion to what *he* loses per mile. Those are results that they do not stop to figure.

Now, this is not the first and I hope it will not be the last time when these things will be reached and handled. At present, possibly but ten per cent of the country is benefited at the expense of the other

ninety per cent. Today, taking the gentleman's own figures of 21 miles as the possibility of a car, why is it? Let them go through the country to the different points where cars are met and hauled in interchange; on every line you will find from ten to one hundred cars standing idle. Why? Because on some technicality, backed by the rules of the Association, the men stand and argue, "I am right and you are wrong," and vice versa. Today the managers all over this country are demanding prompt movement of freight. Gentlemen, what are you doing to insure this? On every desk, in every mechanical department in this country, are complaints from the transportation department of the freight being delayed, and all you can say is the Master Car Builders' Rules are responsible. There are many trunk lines in this country that will not receive a car, no matter if its owners are responsible or the delivering company is responsible, unless that car is put in first-class shape to run. I have hundreds of records to substantiate what I say, if a committee is appointed to investigate. Now, Mr. Chairman, that is a condition. It is no theory, but it is a condition that we must arise and meet. The day for romancing on these facts has passed. I believe that this Association, in deliberation, is equal to every emergency if they will but take it in hand and carry it on to a proper solution.

MR. HUMPHREY: It is not to deprive anyone of the right to speak if he wishes, but I would like to modify my original motion, or, if in order, I will offer it as an amendment, that for repairs done on all cars not owned or operated by railroads, an arbitrary percentage of fifteen per cent be added to same.

MR. MACKENZIE: I second the motion.

THE CHAIRMAN: Do you offer that as a substitute for the original motion?

MR. HUMPHREY: As a substitute for the original motion.

THE CHAIRMAN: Is that acceptable to the seconder?

MR. SMALL: I accept that, Mr. Chairman.

MR. CLOUD: The motion now is—that fifteen per cent shall be added to the price of all repairs, as fixed by the rules, done on all cars not owned or operated by a railroad company and done west of the 105th meridian?

MR. LEEDS: I understand that the original motion is withdrawn?

MR. HUMPHREY: Yes, sir. This is a substitute.

MR. BUSH: Mr. Chairman, before that motion is put, I just want to add one word more by saying that I feel that the question involved in this proposition that has been made is even broader than has been brought out at the present time, and I cannot yet quite see my way clear to support the amendment. On the face of this it would seem that on account of there being no reciprocity in mileage that that might be fair. At the same time it is a question in my mind as to whether the railroad companies West really do have to pay the increased cost of repairs. It seems to me that that question is taken care of by the freight charge. As an illustration of that I will state that on our roads during 1897 the revenue per ton per mile for all kinds of freight was 6 mills per ton per mile. I understood from Mr. McConnell the other day in conversation that on the Union Pacific road the revenue per ton per mile was considerably over a cent.

MR. McCONNELL: No; 9½ mills.

MR. BUSH: Well, 9½ mills. It shows an increase of about fifty per cent over what we get. Now, if that is the case, it seems to me that it is not the railroad company which is the loser in the cost of repairs, but it is the people—all the people in the West. Now, then, supposing that individual companies did not operate their cars, but suppose the railroad companies themselves had those refrigerator cars, would they not still have to pay the same price for repairs?

MR. CHAMBERLAIN: I think I can speak somewhat impartially on this subject, from the fact that even if the original motion had been passed the company which I represent would probably not be affected, say, \$25 a year, situated as far east as we are, and being practically a local line. I believe when I answered the circular I opposed any percentage either for labor or material to Western roads, and one reason was that to a great degree one hand washed the other; that the Union Pacific and these lines running west of the 105th meridian had their cars repaired at the East much cheaper than they could do it themselves, and the matter of reciprocity entered in there. I believe that in answering the circular relative to private lines I said that if there was any reason why those repairing cars west of the 105th meridian should receive any percentage, that they should receive it from the private lines, for the very reason that there was not any reciprocity either in mileage or in repairs. The Western lines are not having their cars repaired by private line companies, and whatever repairing is done to private line cars West is done, according to Mr. McConnell's statement and the statements of others, at a considerable increase

of cost. And the way it looks just at this minute I shall support the last motion made.

MR. HUMPHREY: Mr. Chairman, I do not wish to talk again, because I do not want to take up the time. But I am so imbued with the idea that it is to the interest of this Association to pass this substitute that I want to appeal to the Association to recognize the claim of the Western roads, and to say that we have to pay on private line cars nearly double what we have to pay per mile on cars owned by railroad companies. That being the fact, should they not pay actual cost for their repairs done by the roads west of the 105th meridian? That is all we ask for—to come out even.

MR. MCCONNELL: Mr. Chairman, the question has been raised here and talked upon about the rate per ton per mile received on the Eastern roads. They do not take into consideration that the roads in the East can be operated a great deal more cheaply than they can be in the West; that we have heavy grades, bad water and not as good fuel. We pay a higher rate for all classes of labor, we pay more for material, and I do not think the question of rates should enter into this question at all, because that is an operating problem and not one pertaining to the cost of car repairs.

MR. RHODES: Mr. Chairman, I have listened to this discussion with a good deal of interest, and especially to the clear and concise and apparently earnest way in which the Western representatives have pleaded their cause. At the same time I am frank to say that I am not in favor of supporting the present motion. I would not have supported the original motion, and I am not prepared at the present time to support the pending motion. I want to give reasons why I believe we ought not to support it. The Association, in order that it might have ample time—that its members might have ample time to consider important questions—passed a rule some years ago that all reports should be printed and be in the hands of the members of the Association before the convention assembled. The object of that was that when there were material changes to be made in the methods of handling our Association, that we might consult with our superiors and know how they wished us to act on given measures. As has been explained by the committee, for reasons which we all regret, the committee was not able to get at its work at the time when it ought to have been commenced. It took this question up in a hurried way; it acted on it with such promptitude as it could, and nevertheless it did not get the report before us until we were

at the meeting. The report makes no mention of this proposed addition. It simply takes up the question of prices. As there was no opportunity to prepare a minority report, it seems to me that this Association ought not to be asked to be in better shape for considering the question than the committee was. I have been much interested in what some of the Western gentlemen have said about their being anxious to stay with the Association. I think that the Car Builders generally are anxious to be fair and to do what is right. We showed that last year in appointing this committee. The Association has done a great deal, I think, to ameliorate this condition of things. The conditions which prevail today under the new Interchange Rules enable the Western lines to obtain benefits which they could not obtain under the old rules, and I believe thoroughly that the spirit of fairness which the Association has, as a whole, shown in the past will prevail in the future; but to carry that out we must be allowed to consult with our superior officers, and I for one will vote against the present resolution. If that resolution should be voted down I am prepared to offer a resolution afterward that the subject of whether there should be a differential or not, and to what extent it should prevail, be referred to a committee of three, who shall have nothing else to do but consider and investigate that question. [Applause.]

THE CHAIRMAN: Is there any representative of private car lines present?

MR. MATHER: I do not wish to make a speech on this subject, but as our company seems to be very poorly represented here, I would like to answer the gentleman and say that we receive the same mileage as the railroad company. Our repairs are necessarily heavy, so that the profits of the business are practically reduced to a minimum. I know that the reputation of this convention for justice is world-wide, and I hope you will not tarnish it by discriminating against us in any such way. I do not believe the motion will prevail—at least I hope not.

MR. HICKEY: Mr. Rhodes spoke of submitting this question to superior officers. That matter has been done by some of the Western members. A conference of some of the superior officers was held—one or two conferences, I think—and they said that the consensus of their opinion was that the question in its entirety should be submitted to the Master Car Builders' Association, and that is the feeling that is prevailing among the superior officers, so far as I can learn, throughout the country. If this Association settles on the

proper schedule of prices or differentials throughout the country, it will be indorsed fully by the superior officers. A gentleman stated that a mileage of 6 mills a mile was sufficient to enable us to pay for any extras that we put on. Now I want to say here that in the country where we are doing business it is mountainous, much of it, and that cars that do a good service on the ordinary Eastern lines have got to have greater attention when they are with us and have to be in better condition generally than those running East. In consequence of that our inspection has got to be closer, and very often we have to make repairs on those cars because of the hard service in which they are placed; whereas if they were on an Eastern connection they could get along without repairs. I do not see, therefore, why we should hesitate at all about allowing these Western railways the extras that they are asking for. It is a fair and honest proposition, and I believe that the original motion should prevail in this Association. It has been said also that the Eastern cars going west enable the Western companies to handle their business with foreign equipment, thus saving their own equipment. I have seen the time when we have had hundreds of cars lying on a siding when foreign cars were passing over our line. It was done, of course, for the purpose of rushing forward freight that was important. We did not want to transfer at terminals; we wanted those cars to pass through, and we did it at a sacrifice of our own interests. The question of mileage, it seems to me, ought not to enter into this question at all. This Association, so far as I understand, has nothing to do with rates or mills or anything else of that kind. Those things belong to another association of railway people, and we ought not to touch on them. This is a question of cost to us, and it is a question that we only can deal with properly. We are asking for nothing but that which is fair and honest and just, and this Association ought to recognize it.

THE CHAIRMAN: Is Mr. Bowen in the room?

MR. CHAMBERLAIN: Will you please ask the Secretary to read that motion once more?

MR. CLOUD: The substitute is that fifteen per cent shall be added to the prices of all repairs, as fixed by the rules, done west of the 105th meridian, on cars not owned or operated by a railroad company.

MR. CHAMBERLAIN: I would like to ask the mover of the motion if it contemplates that fifteen per cent be added to the cost of repairs,

material and labor as enumerated in the Code of Rules — the prices in the Code of Rules?

MR. HUMPHREY : Yes, sir.

MR. CHAMBERLAIN : Not to go outside of that?

MR. HUMPHREY : Not to go outside of that ; no sir.

MR. HAYWARD : The claim made by the representatives of the Western lines appears to be founded more on the unfortunate location of their roads and the character of their roads, and also that their business demands the use, to a great extent, of Eastern line cars. In fact, as far as I can discover, it has developed largely that it is the line cars against which this discrimination will come more heavily than against the Eastern roads. Now, would it be fair to make the line cars going west of a certain meridian pay those Western roads a higher price than they do on the Eastern roads? That would be an unjust discrimination, and there is no doubt that those Western lines obtain certain advantages in using the cars of the Eastern roads, and that they have the same chances of reciprocity by sending their cars East to be loaded, if their freight people were looking sharply into the matter.

MR. BOWEN : Some few years ago, when the new interchange was brought forward, among others we were told that it would be to the advantage of private line companies to get on the same basis as railroad companies ; that possibly they had been discriminated against to a certain extent, and it would be wise to come in and be as a railroad company, and on that basis largely we went in, thinking that possibly we might get a little the worst of it, but willing to be treated as a railroad company. I hope this motion will not prevail, although we are not largely interested, and it will not affect us very much. But I do not think it is right that we should be discriminated against, going back to the older method, and I trust it will not prevail.

THE CHAIRMAN : Is Mr. Thomas Kirby in the room?

MR. KIRBY : I hope that that motion will not prevail. I shall simply vote against it. I feel that it would work a great injustice to all private lines. When these rules that we are now working under were inaugurated, we told that committee of twenty-one that we did not have a chance to get back on making repairs. So they said, one hand will wash the other. If we break a drawbar, we will repair it and charge it to you, and you break ours you can do the same thing, and it is a matter of reciprocity. But as soon as it affects only one

side they lose track of all that. I am not prepared to say anything on this. In fact this has taken a very sudden turn. This morning the idea was to add fifteen per cent, I believe it was, to the repair prices, whether roads or private line cars. There seemed to be a great feeling against it, and these people now seem to think that they will take what they can and get it out of the private lines. I think it is an injustice, and I shall vote against it. [Applause.]

MR. JOHNSON : I cannot help but concur with the gentleman. It does seem to me that if the question holds good on one side it should hold good on the other. If the private line cars are compelled to pay this additional, why not the others? The principle is the same, and that is what the Association is working upon. I have always contended, after my experience in Denver, that the Western lines did not receive compensation sufficient to compare with the Eastern roads in their repairs, and I maintain the same today. But I do not believe it would be fair to discriminate against the private lines. The reason why I hold that it would not be right is that if it is right in principle to charge one, it is equally right to charge the other.

MR. L. C. HAYNES : This question of affecting private lines seems to me to be one that the Association ought to view with a great deal of care. As a matter of fact, if this action is taken, it will chiefly affect the refrigerator and stock car lines. The line I represent has none of the latter and very few of the former. But a small proportion of our equipment goes west of the 105th meridian — it probably would not affect our repair bills five per cent altogether. At the same time it seems to me that in the interests of justice some features ought to be considered that have not been given prominence yet. A few years ago there was a good deal of profit in the operating of private line cars. Box cars could be built for \$400, \$500 or \$600, and they paid $\frac{3}{4}$ cent a mile, where the railroads were at a large expense to take care of the repairs, and there was a handsome profit in it. As a result of that action on the part of the roads, the private car equipment very rapidly increased. I think that all the members of the Association will bear me out in the statement that the reduction of the mileage to six-tenths of a cent, and the imposing of additional repairs upon owners was done largely for the purpose of checking the building of private cars, and excepting in case of refrigerator and some stock cars, I doubt if there have been a hundred private cars built in the last four years, and I doubt if there will ever be another private car built. It has been stated, and I think it is borne out by the experience of all of you,

that there is no possible profit in constructing and maintaining and providing a sinking fund for the original construction of a car on the present basis of compensation for its use—take a box car, for instance. For that reason it seems to me 'as though the private line cars, if anything, had the advantage of reciprocity on their side; they furnish the equipment for a very small compensation—scarcely enough to make interest—and in that respect I think are doing fully as much as the railroads are doing in furnishing a certain amount of repairs at a low price. Another feature connected with the operation in a mountain section is that the cost of maintenance, as mentioned by the gentleman on the right, is increased there. The repair bills run higher. It costs higher per mile run to make repairs to run cars on a mountain section than on an eastern section, and if the element of fairness were to be carried to the utmost limit, it seems to me that at the same time an increase of fifteen per cent was made in the charge for repairs, there ought to be an increase of fifteen or eighteen per cent made in the rate of mileage paid. There are not many private line representatives here today. There was nothing anticipated of this nature from the printed proceedings or the printed report. I think it would be only fair that they should have ample opportunity to be heard, and have their arguments presented in a much clearer shape than I can present them, and by those who are much more interested than I am. I trust that the Association will not take hasty action in the matter. [Applause.]

MR. MARDEN: I hope that the discrimination against private car lines will not pass today, while I do not believe there is an Eastern man who would not be willing and glad to have a rule passed that should give our Western friends an equal chance with us. If it can be shown clearly that it is right, and that a discrimination with regard to prices is just, I know that we would accept it cheerfully. I agree with Mr. Rhodes, that we would be better prepared to accept gracefully and cheerfully any rule that might be asked for, if a committee could be appointed, or the present committee continued, perhaps, and further investigate the matter and present clearly to us at our next meeting this topic for consideration.

THE CHAIRMAN: If there is no further discussion I will put the question. The Secretary will read the motion again.

MR. CLOUD: "That fifteen per cent shall be added to the price

of all repairs, as fixed by the rules, done west of the 105th meridian, on cars not owned or operated by a railroad company."

MR. MACKENZIE: I heard something said about reciprocity. I also heard something said about their getting more mileage for the private line cars than for the ordinary railroad cars. If that is so, I do not know why the railroads east of the 105th meridian should not have the benefit of that too. I am sure that they get more per mile for the private cars west of the 105th meridian, certainly, than we do east of it, and I am not prepared to say that I should vote to sustain the motion as it now stands. I do not believe that we can go in and say that those cars are paying more mileage or that they are getting more pay for their cars than the others are. Until such time as that is made clear to the convention, I do not think we ought to entertain the motion.

THE CHAIRMAN: All in favor of the motion will please say "aye"; contrary, "no."

The motion was lost.

MR. RHODES: I move, Mr. Chairman, that the subject of the consideration of differentials and the charges under the M. C. B. rules be referred to a committee of three to report at our next annual convention. (Seconded.)

MR. M. D. GREEN: I represent the National Dispatch Line. If Mr. Rhodes will accept it, I would suggest that this committee show what the actual repairs are upon private lines west of this 105th meridian. In that way we will see what they will save. I do not imagine they are going to save anything—hardly worth the time—but if Mr. Rhodes will accept that amendment it seems to me that it would be very easy for the committee to embody in its report, showing what the repairs are which are done upon the private line cars west of the 105th meridian; showing it separately from the railroads. Now it is all in a lump.

MR. RHODES: It would seem to me that with the very full discussion that has taken place at this meeting, the committee will certainly take into consideration all the various phases of the question that have been presented, and I would not think it wise to embarrass them with any special instruction.

MR. GREEN: I only offered that as a suggestion. The report being brought in in a lump, it gives no one to understand what

the private line expense is. It is all confused with the railroad expense.

MR. POTTER: I would offer as a suggestion, or an amendment, if necessary, that this committee shall consist of one member from the East, one from the West and one representing the private lines. [Applause.]

MR. MACKENZIE: I think it ought to be five, Mr. Potter; two from private lines and three others. I would amend that, Mr. Chairman, that the committee consist of five, and that the representatives consist of one railroad man from the far West, one from the Middle States and one from the far East, and that two others consist of private line representatives.

MR. POTTER: I will accept that.

THE CHAIRMAN: Do you accept that, Mr. Rhodes? The motion as it now stands is that the subject of differentials in charges in M. C. B. rules be referred to a committee to report at the next convention, the committee to consist of five members, three of them to be connected with railroads representing the western, middle and eastern portions of the country, two of them to be connected with private car lines. Are you ready for the question, gentlemen? All in favor of that motion will please say "aye"; contrary, "no."

The motion was carried.

The convention continued the revision of the Rules of Interchange, adjourning at twenty minutes past four.

THIRD DAY'S PROCEEDINGS.

The convention was called to order on Friday, June 17, at 9:15 A.M.

THE PRESIDENT: The Secretary will present the report of the Auditing Committee.

MR. CLOUD:

The committee appointed to audit the accounts of the Secretary and Treasurer of this Association have examined the books and vouchers and found the amounts received and disbursed are as reported by them, and the same are correct.

A. M. WAITT,
WILLIAM GARSTANG,
W. P. APPELYARD,
Auditing Committee.

THE PRESIDENT: You have heard the report of the Auditing Committee. What action do you wish?

MR. PECK: I move that it be received.

The motion was carried.

THE PRESIDENT: The Secretary will now read the report of the Committee on Stenciling Cars.

MR. CLOUD: The question brought up by Mr. Galbraith's letter yesterday was referred to a committee of which Mr. Mitchell was chairman. The committee presents the following report:

To the Master Car Builders' Association:

Your Committee on Stenciling the Light Weight on Refrigerator Line Cars begs to submit the following report:

On account of several of the refrigerator line representatives knowing that their companies object to have stenciled weights on their cars, and preferring to confer with their superior officers before deciding this question, we would respectfully recommend that a committee be appointed on this subject, to report at our next convention, before which time the subject can be fully ventilated.

A. E. MITCHELL.

T. E. PARKER.

H. A. BOWEN.

S. P. BUSH.

F. H. STARK.

MR. MORRIS: I move that the report be accepted and referred to the Executive Committee.

The motion was carried.

THE PRESIDENT: No. 7—Care of Journal Boxes. The report will be presented by Mr. Chamberlain.

Mr. Chamberlain read the following report:

REPORT OF COMMITTEE ON THE CARE OF JOURNAL BOXES.

Your committee appointed on the Care of Journal Boxes would report as follows:

The subject was brought to the attention of the members by the issuance of the Circular of Inquiry, a copy of which is attached:

"To the Members of the Master Car Builders' Association:

"The Committee on the Care of Journal Boxes—Best Method of Packing—would ask for prompt replies to the following questions, to enable it to make up a report to present at the Convention to be held at Saratoga next June:

"1st. Would you recommend a high or low grade oil?

"2d. What does it cost you per 1,000 miles for car lubrication?

"3d. Do you use any special cooling compound to prevent or cool hot boxes? If so, please state what it is and what your experience has been with same.

"4th. How much oil do you use per car, per 1,000 miles?

"5th. What is average number of hot boxes per 1,000 miles?

"6th. Do you prefer cotton or woolen waste, and why?

"7th. Is there any other material, whether patented or not, that you would recommend instead of waste for packing, and why?

"8th. How long do you consider it necessary to soak waste before using, and at what temperature?

"9th. What device, whether patented or not, do you recommend to prevent dust from entering rear of journal box?

"10th. What journal-box lid, whether patented or not, do you prefer, that would prevent leakage of oil and at the same time be dustproof?

"11th. What particular method, if any, have you in arranging the packing in the journal boxes?

"12th. Do you consider it good practice to remove the old packing, mix the best of it with new, thoroughly saturated, waste for repacking? If so, how often should this be done?

"Kindly address all replies to the Chairman, J. T. Chamberlain, M. C. B., Boston & Maine R. R., Union Station, Boston, Mass."

In answer to Question 1, viz: "Would you recommend a high or low grade oil?" A large majority of those who replied recommend a high-grade oil; a few recommend high grade for passenger, and low grade for freight. One member recommends a low grade and plenty of it. While a member on a prominent road would not recommend either grade. From the manner in which the replies were sent in, it is apparent that a high grade of oil is preferred by a large majority of the members.

The answers to Question 2, viz: "What does it cost you per 1,000 miles for car lubrication?" vary a great deal, and the committee is of the opinion that the question was not thoroughly understood. The replies vary all the way from $\frac{1}{4}$ pint of oil, costing 1 cent per 1,000 miles on passenger cars of eight boxes, to 15 cents for freight and 24 cents for passenger, the average being about as follows:

For freight..... 9 cents.

For passenger16 cents.

A number of roads gave replies combining the cost of passenger and freight lubrication per thousand miles, the average cost for those replies being about $9\frac{1}{4}$ cents.

In reply to Question 3, viz: "Do you use any special cooling compound to prevent or cool hot boxes? If so, please state what it is and what your experience has been with same," but six reply as using a compound, and several of these use it but in a small way. One member reports using compound for fighting hot boxes, after which all packing is removed and the boxes repacked, and one recommends using a little only when new wheels have been put in. Several of the members express themselves to the effect that the use of compound does not at all answer the purpose as well as soaked waste, from the fact that they claim it glazes over the waste, making it a little hard, and prevents the oil from feeding freely to the journal. But two members fail to answer the question.

Regarding Question 4, viz: "How much oil do you use per car, per 1,000 miles?" the replies indicate that the average amount on passenger and freight, combined, is about 4 pints per 1,000 miles for freight and 6 pints for passenger; while those reporting both passenger and freight give the average per 1,000 miles as $4\frac{1}{2}$ pints.

In reply to Question 5, viz: "What is the average number of hot boxes per 1,000 miles?" the replies vary considerably, but the average number of hot boxes per 1,000 miles is $2\frac{1}{2}$.

Regarding Question 6, viz: "Do you prefer cotton or woolen waste, and why?" would say one member has no preference; one member prefers elastic wool waste, 75 per cent wool, 25 per cent cocoanut fiber; one member recommends "what is known as foreign wool waste, which is as good as high-grade wool waste"; two members prefer wool for passenger and cotton for freight.

Seventy-five per cent of the members reply directly to the question preferring woolen to cotton, and in almost every case say it is preferred because of its greatly increased elasticity, and that it feeds oil much better than cotton. But one member preferred cotton to woolen waste, because "oil siphons through cotton waste better than woolen." The large majority of those preferring cotton do so on account of its being cheaper than woolen. Several of the members who reply that they prefer woolen to cotton waste also prefer a waste known as asbestos packing, of first-class woolen waste and asbestos, which your committee understands to be a patented article.

In reply to Question 7, viz: "Is there any other material, whether patented or not, that you would recommend instead of waste for packing, and why?" would say but one member in answering the circular failed to reply. All other replies were to the effect that they knew of nothing they would recommend as a substitute for waste. One member replied that he had been making satisfactory tests, but was not prepared to report. One member replied that he recommended the asbestos packing, made by the Franklin Manufacturing Company, as a substitute for good woolen waste. Another member recommended the Franklin Manufacturing Company's asbestos packing as a substitute for good woolen waste in the following words:

"I am prepared to recommend the Franklin Manufacturing Company's asbestos packing to good woolen waste because of the fact that it is composed of first-class woolen waste and asbestos, that it feeds the oil as good if not better than good woolen waste; also because there is not that liability for it to get packed as hard as wool; its elasticity is as great, at least, as first-class woolen waste; and also from the fact that the temperature of heat in the box packed with the Franklin is much less than in a box packed with good wool, and there is consequently less liability for hot boxes."

To Question 8, viz: "How long do you consider it necessary to soak waste before using, and at what temperature?" one member replies, "Nil," which the committee understands to mean no or none, indicating that this member does not consider it necessary to soak the waste at all, while the rest of the replies are unanimous in saying that the waste should be soaked, one member giving the number of hours as 12, while the rest of the members vary from 24 to 48 hours, the average number of hours indicated by the replies being about 36. The temperature recommended is from 40 to 80 degrees, with an average of about 65 degrees. Several of the members recommend not less than the average, 65 degrees, in winter, and the outside temperature

in summer. One member replies that waste should soak 48 hours, and before being used the surplus oil should be allowed to drain off from the waste 3 or 4 hours, and that in winter the waste should be soaked in an inclosure and be kept as warm as practicable.

In reply to Question 9, viz: "What device, whether patented or not, do you prefer to prevent dust from entering rear of journal box?" one member replies, "Vulcanized fiber"; one member replies, "Close-fitting dust guard"; one member replies, "Using Soule, and also Harrison, dust guards, but not prepared at present to recommend"; two members reply, "Wood dust guard lined with rim of rawhide or vulcanized fiber"; one member replies, "Common wood dust guard, fitting properly," and explains his position as follows:

"An experience with the numerous improved and patented dust guards, none of which were as good or enough better than a simple dust guard of basswood, with tin strips top and bottom, made from dry lumber, and shaped to fit the slot and axle, pay for their increased cost. It is important to have a good plug fitted to the top of the slot. More dust comes in through the top slots than comes in through the backs."

One member recommends the Stier dust guard; one member recommends a wood dust guard with canvas on side and hole cut in canvas one inch smaller than the axle. One member prefers the Soule rawhide lined, on account of its lasting qualities. One member prefers the Harrison guard. The balance of the members, who are a large majority, prefer the ordinary wooden dust guard as the most practical, although some of them say they never saw any that were dustproof.

Regarding Question 10, viz: "What journal-box lid, whether patented or not, do you prefer, that would prevent leakage of oil and at the same time be dustproof?" Quite a number of members reply that they have never seen a lid that was dustproof, and while there are numerous replies recommending a special lid, the preference seems to be an entirely local one, and it is apparently not used to any great extent. Four members prefer the McCord, and ten the Fletcher, the rest being scattered, and in such a way as to make it impractical for the committee to describe them.

In answer to Question 11, viz: "What particular method, if any, have you in arranging the packing in the journal boxes?" One member, our linguist, gets in his "Nil." One member has no particular method, while the balance of the replies indicate that this question has been receiving considerable attention in the past. With the exception of the two members above referred to, all have something to say on the question and have a method which is carried out by most of them, same being that the waste, soaked from 24 to 48 hours, is carefully but not tightly packed in the box, care being taken not to have the waste come to within $\frac{1}{2}$ inch of the underside of journal bearing. One member says: "Pack box with soaked waste firm enough so it will not fall away from journal, but not so tight as to squeeze out the oil. Keep waste $\frac{1}{2}$ inch below line of brass and pack box flush with end of journal. If waste is raised too high on sides of journal it is likely to be caught by brass and drawn between brass and journal, and if so, a hot box is sure to occur."

One member replies: "Pack box firmly, but not too tight and not above center of journal, and put a sponge of waste between button and mouth of box."

One member, Mr. Waitt, replies by sending copy of instructions issued to car men, and Mr. N. L. Smitham, of the Texas Midland, also sends copy of instructions, both of which are embodied here.

LAKE SHORE & MICHIGAN SOUTHERN RAILWAY CO.

PACKING AND OILING OF PASSENGER AND FREIGHT CARS.

PASSENGER CARS.

REPACKING.—All journal boxes under Lake Shore passenger equipment cars will be repacked with waste saturated with winter oil, beginning the work each year on the first day of November. All good, clean waste removed from boxes will be used in this repacking, after having had the summer oil thoroughly squeezed out by pressure, and resaturated with the winter oil. In addition to the above repacking, all cars will be repacked six months afterward; the waste to be removed and all good, clean waste resoaked in summer oil. In this repacking, the waste removed need not have the oil squeezed out. In repacking boxes, new waste should not be used alone, but should (where it is practicable) be mixed with the old, the two to be mixed in the proportion of half old and half new. When boxes are repacked, tin tags 1 inch by 3½ inches, having station abbreviation with month and year stamped thereon, will be attached to two opposite corners of each truck frame. Tags applied when winter oil is used to have four dot marks after the date, thus: Ch. 11-98:

OILING.—All through passenger trains on the main line will be oiled at Buffalo and Chicago only, and no oiling at intermediate points will be done, except in case of a warm or hot box, or other emergency. All local and branch passenger trains and cars not running in main line service between Buffalo and Chicago are to be oiled once in every 2,000 miles run, the date of oiling of all cars in such trains to be marked in chalk on underside of side sill over each truck, giving month and day of month. In each case of cars which have no regular run, inspectors will be expected to use their judgment in seeing that the cars are given sufficient oiling when at their stations, care being taken to avoid using oil unnecessarily. Division Master Car Builders will assign the terminals at which the regular oiling of cars in local and branch trains will be done.

FREIGHT CARS.

REPACKING.—All Lake Shore freight equipment cars which are placed on shop repair tracks are to have the waste removed from boxes and boxes repacked. All waste removed that is good for further use to be resoaked in saturated waste tank for 48 hours, and used again in repacking boxes under such cars. This same practice should be carried out at inspection points to as great an extent as possible, consistent with surrounding conditions.

DOPING.—All cars received from connections at interchange points, also all cars set out of trains at stations where inspectors are located, and all foreign cars placed on shop repair tracks, are to have the lids of journal boxes opened and the packing put in proper condition to run without question over the road, using well-saturated waste for the purpose. The use of an oil can at stations other than East Buffalo and Chicago will not be permitted. In addition to putting waste in good condition, examination must be made to see that journals, journal bearings and keys are in proper condition.

Caboose car boxes will be taken care of by the use of saturated waste in the same manner as other freight car boxes. They should be examined after each trip, and when in need of oil, saturated waste should be applied.

OILING.—All through freight trains on the main line are to be oiled at Buffalo and Chicago only, and no oiling will be done at any of the other points under any circumstances. Where it is necessary to put a box in good condition, either by reason of a hot or warm box, lack of oil or waste, it should be done by using the saturated waste. In the treatment of boxes having a sufficient quantity of packing, but which are in need of oil, a small amount of the packing should be removed to give place to the saturated waste which is to be applied, care being taken to apply the saturated waste so that it will come in contact with the journal where it will do the most good.

PASSENGER AND FREIGHT.

METHOD OF PACKING.—In the packing of boxes the first portion of waste applied should be packed moderately tight at the rear end of box. Care should be taken to keep the waste at the sides of box down below the brass about an inch, and also to have that portion of the waste forward of the journal separate and distinct from that which extends from front end of journal to the back of the box. This will avoid the disarrangement of the packing at rear of box. The roll which is placed in front of box to not extend above the lower edge of opening of box.

(Signed) M. C. B.

TEXAS MIDLAND RAILWAY CO.

INSTRUCTIONS TO CAN MEN AND OTHERS WHO AT ANY TIME MAY PACK OIL BOXES.

It may be strange to say care should be taken and instructions issued in so simple a matter as the packing of oil boxes. Be that as it may, I believe, after you have investigated thoroughly and learned that about seven out of ten boxes are packed as shown in Fig. 2, you will then agree with me there is room for improvement.

In the blue print, prepared for this purpose, you will notice Fig. 2 shows a box improperly packed. One trouble about this box is, the best part of the packing is where it is least needed, thus depriving the journal of the proper lubrication, directly under the brass and in the center of the journal, where the load is carried.

Another fault with this box is the vacant space in the back, which makes an inviting place for sand and dirt that gets by the dust guards. You can plainly see it can easily get to the journal and cause the box to run hot when, apparently from the outside, the box is packed in good shape.

You are aware that a perfect dust guard can only be maintained for a short time after leaving the shop; they soon become worn and leave quite an opening in the back of the box. Your attention is called to Fig. 4, which shows how you can protect the bearing from dust and the same time hold the oil in the box.

I will now proceed to show the method by which I desire the boxes packed hereafter.

First, see that all sand and dirt is out of the box; then take a piece of waste that will show oil on the surface when you press it between your thumb and forefinger. Have it twisted so it will be about two inches in diameter and eight inches long. Put this in the box, giving it the circle of the journal, and place as far back as you can with your hands. Now take your packing hook and put the waste in posi-

tion as shown in Fig. 4; raising it up from the bottom of the box and hanging it on the inside guide of the dust guard. This will, as stated above, prevent the dust from coming into the box and the oil from running out.

Now you can take your waste that has been soaked in the oil for at least three days, and having all of the oil it can contain without running out while handling, and put it in the box after the same manner as the first piece. You need not, however, twist it, but put it together neatly and about the same length so that it will be one piece of waste from one side of the box to the other, and thus avoid having little fragments that are apt to roll up into knots when the car moves. You can see that waste put in as directed above will brace itself against the sides of the box, thus overcoming the tendency of the journal to roll it.

Fill the box as directed, and you will have the same results as shown in Fig. 1. Keep the waste three-fourths of an inch down from the edge of the brass, so the ends of the waste cannot get between it and the journal, which is often the case, and causes trouble that is hard to account for. Attention is called to Fig. 3, which shows you an oil line. Any oil that might be put in the box, more than is shown here, is useless, and in most cases will only run out of the box and be wasted.

Figs. 5 and 6 show the proper method of touching up the waste that has settled away from the journal. Start your packing iron as shown at A, Fig. 5, keeping close to the bottom of the box; when you have reached the point shown by B, turn your iron as shown by C, Fig. 6, and run it along the bottom and close to the side of the box, to the back wall as shown by D; now by bearing down on the handle you will raise the point as shown by E, thereby raising the packing up against the journal and at the same time leaving a channel on each side of the box, as shown by the dotted line in Fig. 1; any surplus oil that may be in the box can run in this channel and will feed up through the waste to the journal.

This should be done with new packing, also, when touching up boxes. If you see that the waste is a little dry, take your packing hook and make a small basin in the waste, at the end of the journal and base of the collar; pour into this about a wine glass full of oil.

In conclusion, to enable you to keep a correct account of the amount of waste and oil that you use, I will state that $2\frac{1}{2}$ pounds of waste and 1 gallon of Galena car oil will make 10 pounds of dope ready for use.

Hoping that you will give this matter close attention, I remain,

Very truly yours,

Approved: ASST. G. M.

(Signed) ACTING M. M.

One member replies: "A rope of waste is made and packed tightly against back of box to assist dust guard in excluding dust; the waste from which oil has been drained is then placed in box, pushed well back, and maintained at a level a little below box opening."

One member replies: "Pack back end of box well, then forward to center line of box, stopping waste even with end of journal, then placing small bunch in loosely to prevent slush of oil."

One replies: "Pack back end of box with soaked waste, oil having been squeezed out; then pack not too tight the balance of the box with soaked waste, not higher than within $\frac{1}{2}$ inch of underside of brass."

One replies: "Waste should be applied in small separate bunches, the first of which should be placed in the back end of the box, and the oil squeezed out of them."

Another says: "Roll waste in small balls the size of an apple, and push them in end of box one after another."

Regarding all the replies above mentioned, it should be understood that all waste applied has been soaked for 24 to 48 hours.

Your committee might go on and quote further replies, but in a general way the methods are substantially the same.

Regarding Question 12, viz. "Do you consider it good practice to remove the old packing, mix the best of it with new, thoroughly saturated waste for repacking? If so, how often should this be done?" The members replying to the circular are nearly unanimous in the opinion that this should be done, but very few venture an opinion as to how often it should be done; one replying, twice a year; one replying, every 90 days; one replying, twice a year in passenger service; one replying, every 3,000 miles; one replying, twice a year—in the spring and latter part of fall; one member does not consider it good practice, and two members do not answer the question at all.

Our friend who is so fond of using the foreign language, and gives the committee the trouble of getting it translated, gets in his usual "Nil."

Several of the members prefer to use the good old waste shaken out and put in the bottom of the box, using new, soaked waste on top. Several reply that they prefer the old waste, thoroughly shaken out, resoaked, and mixed with new; two reply, not as a rule, but whenever packing is removed, the good should be mixed with new; one replies, "If soft, yes; if hard, not until it has been pulled apart and resoaked"; another replies, "Only in case of necessity, when wheels are changed, or when shop examination indicates that waste is unfit for further service, or on account of hot box. All good packing removed is put in soaking vat with new waste and treated in the same manner."

Your committee, in summing up the evidence from such data as has been given it in replies to the circular of inquiry, desires to call the attention of the Convention to the fact, that considering the membership the replies were limited, and the committee feels that they are only called upon to take an account of the information given it in the replies. They therefore call attention to the facts—

- 1st. A large majority recommend high-grade oil for car lubrication.
- 2d. But few use cooling compound, and most all consider it unnecessary in connection with car oil boxes.
- 3d. That woolen waste is preferred by a substantial majority over cotton waste, and in this connection would say that of the former, two are now experimenting with a waste of wool and foreign material, which they claim is superior to woolen.
- 4th. It is the unanimous opinion that there is no material known that is a practical substitute for waste for journal-box packing, a large majority recommending woolen as the best, and your committee is of the opinion that the above majority represents the views of a majority of the members of this Convention.

The committee calls attention to the fact that two members are making tests, but are not ready at present to recommend, and also to the fact that several of the members recommend woolen waste with a percentage of asbestos mixed with it as being better than woolen waste.

5th. That a large majority recommend that waste be soaked between 24 and 48 hours before using, and at a temperature of about 65 degrees, and your committee is of the opinion that waste should be soaked at least 36 hours at a temperature of not less than 70 degrees.

6th. That for all practical purposes the members almost unanimously recommend the common wooden dust guard so generally in use at the present time, and your committee concurs in that recommendation.

7th. That while there is considerable difference of opinion, as indicated in the replies, existing in the minds of the members as to the best oil-box lid, all seem to desire a lid that will keep the oil from getting out of the box and the dust from getting in, the preference expressed being for the so-called Fletcher lid first, with the McCord second.

8th. That the members regard the matter of careful packing as being one of utmost importance, their replies indicating that their careful attention has been given to the subject.

They are particular to have the waste soaked thoroughly at least 24 hours, packed firmly, yet not tightly, care being taken to see that the waste does not come up to the bottom line of brass within $\frac{1}{2}$ inch, and your committee fully indorses such practice.

9th. That the members very generally consider it good practice to shake out the old and discard the worn-out short waste, mixing the good old waste, after resoaking, with the new, the only difference of opinion being as to when and how often it is necessary to do this.

The committee is of the opinion that it is good practice, and should be done at least once a year, and the date of repacking stenciled on the truck. It further recommends it should always be done with the removal of oil boxes or change of wheels, and also in shop practice, when there is any indication that the waste has in a degree become matted or partially worn out.

In conclusion, your committee feels that it can do no better than to quote the concluding paragraph of the report of your committee of 1888 on "Journal Lubrication and the Best Practice for Economizing Oil."

After reviewing the whole subject, your committee is of the opinion that no greater economy can be had in journal lubrication than by the use of petroleum or its products, either with or without mixtures of other oils or lubricants, along with a good elastic or spongy packing of woolen waste or material equally as good, and used in a thoroughly tight and well-constructed journal box, made especially with a view to preventing the loss of lubricant and excluding foreign particles of dust from the journal box.

J. T. CHAMBERLAIN, Chairman,
J. J. HENNESSEY,
R. H. JOHNSON,

BOSTON, MASS., May 2, 1898.

Committee.

THE PRESIDENT: You have heard the report of the committee. What action do you wish?

MR. MITCHELL: I move that the report be received.

The motion was carried.

THE PRESIDENT: The report is now open for discussion. If there is no discussion we will take up the next subject.

MR. WAITT: Mr. Chairman, it seems to me this is too important a subject to let go by without a discussion; especially does it seem important when we note the result of the answers that have been made to Question 5, and see that the average number of hot boxes per thousand miles from the roads that have reported amounts to $2\frac{1}{2}$ hot boxes per thousand miles. It seems as if with so high an average of hot boxes as that, there is an opportunity for radical reform somewhere. I surely do not believe, on the average of roads, excluding some of those that go through very sandy territory, and like roads in the South, that there is any justification for running cars with anything like that proportion of hot boxes. I was looking up the records on the Lake Shore just after receiving that report for the year 1897—and, by the way, I would say that hot boxes are things to which we give a great deal of attention, and watch very closely, having a report made—not a hit or miss report, but one that covers everything in the way of hot boxes that requires attention or causes delays to trains on the road—and from these reports for 1897 for the whole year we average, on passenger equipment, one hot box to every 70,000 miles run. On freight equipment, with equal care in getting the reports, we had one hot box to every 20,000 miles run. That result was not obtained without care. It meant a great deal of attention; and I would say that were it not for the foreign cars which were running over the line, which had not received proper care on the home lines, the mileage to a hot box would have been more than four times what it was. On the reports that come in of hot boxes on freight cars, eighty per cent are on foreign cars and about twenty per cent on our own cars, and I think that shows, for one thing, the benefit of having systematic rules for guidance in caring for journal boxes, and in watching them very closely. If we have an excessive number of hot boxes occurring on any division, as shown by the reports, attention is at once called to the matter and an explanation asked for, and if we cannot get a satisfactory explanation, some one who is competent to look into the matter goes about among the inspectors and oilers and watches their practices, and almost invariably some good cause will be found for the excess, and that cause is removed and better results occur.

I do not think that we can expect to have good results in run-

ning our journals unless we keep the dust out of the oil boxes. Now, the committee has recommended excluding the dust from the front end of the box, and yet they seem to think that a common wooden dust guard, made as most of those are, about from $\frac{1}{8}$ to $\frac{3}{8}$ inch larger than the part of the axle where they fit, will be satisfactory. I think it is a fact that you will find the waste in the oil box a great deal more dirty, full of grit and sand, at the back end of the box, than you will at the front end, even with the very poor non-dust-tight oil-box covers that we have at the present time, and it seems to me it is worthy of attention to get something that will exclude the dust at the back end of the box. I would not publicly advocate any one dust guard to the exclusion of another. I do believe, though, that it is worth while experimenting and finding from the many that are in the market something that will be better than the common dust guard, which is no protection to speak of in the box. I know that we have experimented with two or three, and I can surely say that there has been a difference shown between them, and there are advantages in some over the plain, crudely made wooden dust guards, and I believe that if some of the gentlemen who have in their reports or in their answers advocated the wooden dust guard would experiment, or have experimented, with other devices, they would have found some advantages over the plain wooden dust guard.

Another feature that comes in — probably all have experienced in extreme cold weather an excessive number of hot boxes on their cars, those that run through a cold part of the country. We have found, from a few years' experience in the past, that it is very desirable, almost essential, if you are going to keep your average of hot boxes down, that before winter comes on all of the lighter summer oils that have been used in the boxes be entirely removed from the waste. If the light summer oils are left in the waste and the winter oil that is used for a lubricant be allowed to mix with the other oil, as soon as cold weather comes the summer oil will congeal and thicken, and the fibers of the waste, which are and have been for a long time filled with the oil, will become nonconductors of the oil, and the result is, when real cold weather comes, your waste is stiff, the oil will not be fed by the waste to the journals. The waste will jar away from the underside of the journals, and you will have hot boxes. Several years ago, in conversation with one of the representatives of a road going through the northern part of the United States, through the coldest territory,

he suggested the practice of removing the light oil before cold weather came on, and for several years it has been our practice on the Lake Shore in November to remove the waste from the journal boxes, and under a press squeeze out all of the lighter grade of oil and put that aside until summer comes, to be used in such service as it might be judicious to use it in, and then resaturate the waste with the winter oil, and after it has been saturated a long enough time, forty-eight hours or so, repack the boxes with that grade of oil; and we found that the results since that practice was adopted have been much more satisfactory than previously.

Another curious thing that has been noticed: The excessive number of hot boxes in real cold weather seems to come after the fall has come, when the weather is beginning to get a little more moderate; and last winter some investigation was made into the cause of that, and it was a curious thing that it was found, after the weather had begun to moderate, when we would open the oil-box covers there would be a collection of water inside the oil boxes, and in proportion to the amount of water that seemed to be in there — I suppose the condensation from the atmosphere — in proportion to that, seemed to be the lack of lubrication of the journals, and the increase of hot boxes. That seemed to be overcome by more frequent withdrawal of the packing and removal of that moisture. On some of our fast trains it has been found a wise practice, whenever there has been a moderation of the temperature in severe cold weather, to make sure, before those trains go out, that all water has been removed from the waste, and it practically has stopped hot boxes on such trains. I speak of that because it may be of some help to some of the other roads who have not noticed that peculiar feature.

MR. MITCHELL: I would like to ask Mr. Waitt how hot a box must be on the Lake Shore before it is reported as a hot box?

MR. WAITT: Anything that causes a delay to a train, or requires the box to be repacked or a new brass to be put in.

MR. MITCHELL: Mr. President, possibly this large percentage of hot boxes may be caused by other railroads practicing the scheme which we have on the Erie. We have not got force enough to make as careful reports as the Lake Shore. We call every box a hot box that is hand-warm, that requires the least bit of attention. As the inspector inspects the train at inspection points, if a box is hand-warm at least, he raises the lid. The oiler then repacks that box and gives it attention. That box is reported on the Erie as a hot box, and yet it

has given no trouble, and might not for a hundred miles farther. All those boxes are reported with us as hot boxes.

THE PRESIDENT: I would like to ask Mr. Chamberlain if in that report he does not mean train miles instead of car miles?

MR. CHAMBERLAIN: No; that is the way it went out, sir — per thousand car miles. It did not say so, but I think that is the way the members generally understood it.

THE PRESIDENT: Is there any further discussion on this report?

MR. CHAMBERLAIN: I might say, Mr. President, in answer to Mr. Waitt in reference to what he said about dust guards, that while a few of the members recommended vulcanized fiber and wood, and several other special grades, they are all substantially the same as the old wooden dust guard, except that they are made of material that is supposed to last longer. They do not exclude the dust any more, and I believe that of over fifty replies received, there was not over twenty that recommended any special dust guard. I think Mr. Waitt was experimenting with a guard he did not feel like recommending, and there were several that were experimenting, but they did not represent more than four or five of all the replies that we got.

MR. WAITT: I would like to call to Mr. Chamberlain's attention the very excellent results that were obtained some years ago when he was on the Boston & Albany road, where there was quite an expensive arrangement used for excluding the dust. If I remember rightly the reports made at that time, the mileage from the oil used was really wonderful, and the freedom from hot boxes. That, of course, would not be a practical device for general railroad use, and yet it suggests the advisability of some experiments in the line indicated with regard to something in the way of a dust guard which will adjust itself or will always clasp the axle tight, and thereby prevent the opening between the dust-guard seat and the dust guard which so soon comes in the dust guards that do not provide for wear. There are a good many in the market. I would not recommend one over another, because I have not experience to warrant it. There is one other point in connection with the possible reduction of the proportion of hot boxes on roads that are receiving foreign cars. The gentlemen will notice in the rules of practice for packing and oiling on the Lake Shore as printed in the report, it is our practice whenever one of our own cars goes into the shop or on the repair track for repairs, light or heavy, all of the packing is removed from the oil boxes and the oil boxes

are cleaned out. Any dirty waste or any that is unfit for further use is removed, and the boxes are repacked with good old waste or freshly saturated waste, so that they go out in clean, good condition for service. I think if a practice of that kind—not on every inspection track or outside repair track—but if a practice of that kind was adopted in all of our shops, and it can be without any material increase of force; it can be done and has been done, I have seen, in many shops, by having the same number of men doing the work, only watching them a little and making them hustle and making them understand that they have got to do it, and the results obtained were highly satisfactory. I believe a general practice of that kind would reduce our hot boxes and the delays to trains and would make it more economical for all of our roads that would mutually share the advantage.

MR. BRAZIER: It is almost an unknown thing on the system I represent to have a hot box on passenger cars, except on Pullman cars. I do not think last year we had a delay of thirty passenger trains over our entire system caused by hot boxes, and we attribute it to our system of oiling and packing boxes. The old method was that the inspector would go along, open the lid and put in a little oil. At night the foreman would ask him how much oil he used. He would answer, "Five gallons today." The foreman would say, "You are a good man." We took the oil cans away from every inspector we had, and we use saturated waste, and we make our men go and loosen the waste up and get it up to the journals. I have personally watched some inspectors go along, after we have had some trouble with hot boxes on freight cars, and they would use their feet; they would open the box a little, put a little oil in and go on. That does not amount to anything. It is a waste of oil. If you get your packing well soaked you will find you have fewer hot boxes. Since we inaugurated that system I think the Illinois Central has cut down the oil consumption almost a third, and our hot boxes fully fifty per cent, right out of Chicago. I am free to say that anyone can come and examine our records, and he will find that on our passenger car service it is almost unknown to have a hot box. Our officials would give it to us pretty heavy if we did have them. They are sometimes occasioned by the journal bearings being worn down too thin. We have more from that cause than any other. I think Mr. Waitt's remarks with reference to the dust guard are all right. We are trying at the present time two or three patent dust guards. I won't mention their

names, but I will say that I am trying one on one of our cars, and the mileage is something like 30,000 or 40,000 miles. It has not had two quarts of oil yet. It is tight back and front. The front is put on with bolts; no one can get at that, and it is making a remarkable record, but I am a little weary of it. I think every new thing in creation we get in Chicago, and we are trying three at the present time. I get a good deal of information by visiting around, and I find that the North-Western is using a dust guard which I think is not patented. They take their old wooden dust guard and pick up their pieces of scrap plush, which makes a good dust guard. Our dust guards cost us about $2\frac{1}{2}$ cents apiece, and we feel as if we can take them out and throw them away every time we exchange, and we are trying to infringe on the North-Western. A gentleman called on me the other day to sell me a dust guard. I asked him the cost, and he said 62 cents apiece. I told him our road was not in condition to pay such a price when we had dust guards which cost us only $2\frac{1}{2}$ cents apiece. If you pay more attention to your oiling and your packing and your journal boxes, you will have fewer hot boxes.

MR. MENDENHALL: I want to rise to the defense of the wooden dust guard. If we could have a machinist's services and spend 62 cents, as Mr. Brazier says, or more, we could undoubtedly get an efficient dust guard, but we can get it much more easily and cheaply with the wooden guard if we part the wooden dust guard and drive one section up from the bottom and the other down from the top, a good driving fit, and we will have a tight dust guard. Undoubtedly you will find a great surprise in store if you use such a device.

MR. SCHROYER: On the North-Western road we know something about hot boxes, and we know a good many things that we do not like to get up in meeting and tell, and I am not going to tell them. But I want to run off on another tack in this, and call your attention to the fact that I am of the opinion that we are too contracted in the construction of our oil box, especially in so far as the dust-guard face is concerned. Do you not think it is absurd for us to put in a $\frac{5}{8}$ or $\frac{1}{4}$ inch dust guard and expect that small piece of wood or fiber to exclude the dust? It must necessarily work in the space, as it is loose. I am of the opinion that if we would contract our wheel hubs a quarter or three-eighths of an inch and take that space in the dust-guard opening of our oil box, and make our dust guards of wood $\frac{7}{8}$ of an inch in thickness and sufficient in width outside of the opening, and make it strong enough so that it is not going to break

as quickly as it does, that we would all obtain better results in dust guards. We have obtained good results in coring the dust-guard opening all the way up through the box, and we make the dust guard long enough so that it goes all the way through the box. Before we adopted the Master Car Builders' Standard we used a $\frac{3}{8}$ -inch dust guard, and I want to tell you that it is a good deal better than the Master Car Builders' Standard ever was. We make them of wood, and I should say they cost us $1\frac{1}{2}$ to 2 cents apiece, and we do not feel that we can afford to put in dust guards at 10 or 12 cents or half a dollar apiece, as a man at Congress Hall asked me for his dust guard yesterday. Another thing I think we are wrong in, and that is the contracted width of our box outside our pedestal guides. We are so narrow there that when our inspectors and oilers along the road are endeavoring to oil a box they give the can a tilt and the oil flows across the end of the journal. I do not think you can help noticing that thing wherever you have oilers. We make a mistake in not having the width of our box sufficient so that you can get the spout of your oil can back to the side of the journal and put the oil where it belongs. Something has been said about woolen waste. The only objection I have to woolen waste is this, that it does not hold up the oil as the cotton waste does, and our boxes go out on the road and our oilers and inspectors look at them, and they will give them a dig and think the thing is dry; they give it a little oil because they think it is dry. We did not find that the case when we used cotton waste. It was a better absorbent to carry up the oil — better than the woolen waste. We use woolen waste on passenger cars, and the reason we use it there is this, that our cotton waste was stolen from us to such an extent and used by trainmen and others that we had in self-defense to use something else that they could not use, and that is the reason we took woolen waste. But I do not think it is a particle better than cotton.

As far as hot boxes are concerned, I do not suppose we are troubled any more than others. We have records that are kept by our general superintendent and my own office, and the one is checked against the other. I want you to understand that the general officers of the North-Western road are after the car department all the time if there is any trouble with hot boxes. We have the waste removed from the boxes of the cars that are received in our important repair yards. It is taken into the assorting room, where we have a pneumatic press. We have there large vats, in which we

keep our waste saturated. Sometimes it is in there for weeks before it is used. We squeeze the oil out, and then the waste is sorted over and dried, and the babbitt and brass is taken out of it, and that which is good is put back into service. That which is bad is sent to the locomotive department for use in starting fires, and we get enough oil out of that old waste that is handled in that way to pay us about fivefold for the work of doing it, and we think it is a good practice. We do not change our oil in spring and fall. I think it is more essential that oil should be changed in spring than in fall. The summer oil, if used in the winter, will form an emulsion in the box, and that emulsion does in a measure hold up the new oil put in. The winter oil in summer gets as thin as water, and it flows out. It is not held up properly by the waste. So I think it is more important that the oil be changed in the spring than in the fall; but we do not change, we do not make a practice of changing waste at any time. We do not make a practice of giving especial attention during the spring and summer months, when the changes are being made from one to another, and more especially during the summer season when ballasting is being done. That is the period when we have the most trouble from hot boxes.

MR. LEEDS: Human nature is pretty much the same whether it be in a car inspector or a Master Car Builder. It looks to me as though we were making a scapegoat for a good many other deviltries that ought to be looked after first in our lubrication. Whenever we have a hot box on the road we call up our Master Mechanics and Master Car Builders and foremen, and all of them, to give an explanation, and it is, almost invariably, hot, dry, dusty times — all on account of heat and dust, and they do not always consult the records of what the weather has been in the past few weeks. That holds good with the exception of one division on our road. On that division the sand will pile up on the brake beams from an inch to an inch and a quarter deep every trip. That sand is as fine and as sharp as emery. We cannot run a set of driving axles one-third as long there as we can on our other divisions. The journals always look white and dry as though you had been using emery cloth on them. They never get a blue glaze on them, and our wheels will not run half as long before they will wear through the chill as they will on any other division, and we never have any hot boxes. [Laughter.] That is the only place on the road where the hot, dry, dusty season does not cause hot boxes or

where that is not used as an excuse. Mr. Waitt says that eighty per cent of the hot boxes on his road are on foreign cars. That indicates to me one of two things — either he is not carrying out the rules in giving foreign cars the care and attention that he gives to his own, so far as lubrication is concerned, or else this great difference is to be credited to the refinements he has shown us at different times as being practiced on his road. Heretofore he has come before us with nice gauges to gauge the inside of his boxes, outside of his brasses and everything of that kind, which, in my opinion, goes a great way further toward the reduction of the number of hot boxes on his system than the mere matter of his soaking out his waste, and even his dust guards. In my opinion nine-tenths of the trouble comes from lumps in our castings, in the inside of our boxes, the boxes not being cored true to the angles and dimensions given, either in the brasses or in the box, and any inequality there is bound to cause trouble. Another thing is that while we make a long bearing apparently with our wedged brass, we recognize that it is not practicable to use such a bearing, and so we put a radius on it and get a center bearing, a pivoted bearing. There is no brass that is strong enough to stand the carrying weight that is put upon it on any such bearing. To illustrate it better, a couple of years ago the general superintendent of a road came to me and said: "A certain class of cars go over our road and we never have any hot boxes on them. Our own equipment is on fire all the time. I have got at my Master Car Builder about it and he does not give me any explanation. Can you?" I said: "Yes. You have got after the wrong man." "Who is it?" he asked. I said: "You. [Laughter.] You do not allow your Master Car Builder either to make his own brasses or to buy them. You go into the market, and Tom, Dick and the Devil come along, and you ask them what they will furnish you brasses for." I asked him what he paid for brasses. He said 8 cents a pound. I said: "No living man can make a brass that is fit to put even into a freight car for less than 11 cents. You are the man that is burning up the whole country. Go home and correct your own errors and I will be responsible for your Master Car Builder." I think a good deal of that trouble has been corrected, and I think a great deal of the trouble for which the packing is made the scapegoat is to be attributed to what I consider the abortion of a box that we have got as a Master Car Builders' box. [Laughter.] Next, the inefficiency of the inspection that allows that box to go out in even worse condition than the design calls for

[laughter], and in the next place the purchasing of material that is not fit to put into a wheelbarrow. [Applause.]

THE PRESIDENT: If there is no further discussion, we will proceed with the next subject.

MR. LYON: I would like to ask the committee in regard to its statement on page 2 that the average number of hot boxes for 1,000 miles is two and a half. It seems impossible that that can be right, if they mean car miles, and also if that includes all passenger equipment. Two and a half hot boxes per thousand car miles would run up into the hundreds per day on a very small equipment.

MR. CHAMBERLAIN: Replying to the gentleman who last spoke, I would say that the committee sent out a circular—I do not know whether he received it or not—the fifth question in which was, “What is the average number of hot boxes per 1,000 miles?” And taking up the little less than fifty replies, adding the hot boxes all up together and dividing them by the number of replies received, the number of hot boxes per thousand miles was two and a half. That was the only way in which the committee could arrive at the result. It is barely possible that some of the members may have construed Question 5 to mean per thousand train miles—that is barely possible; and I think that if the committee was going to do it over again it would make that train miles, or have it a little more definite than it is. I think it is definite now, but undoubtedly it is misunderstood by some. The committee thought it was a very high number. I know it is very much higher than the road I represent. But that is the only reply I can give to the gentleman, that by dividing the number of hot boxes by the replies received it was two and a half per thousand miles.

MR. BALL: I want to indorse what Mr. Brazier said in connection with the success obtained by discarding the use of the oil can. It will be noticed in the instructions on the Lake Shore that particular stress is laid upon doing the oiling by the use of saturated waste, with the exception of two large terminal points, Chicago and East Buffalo, where the number of cars handled precludes the doing of the work with the saturated waste by reason of the number of men we have for that purpose at those points. After the adoption of this practice we reduced the number of hot boxes on our freight cars about thirty-five or forty per cent, and it was more noticeable on foreign cars. This, no doubt, is due to getting the waste—the saturated waste—in a position against the journal where it will do the most good. If the box

has a sufficient amount of packing in it after it is dry, our practice is to remove a sufficient quantity and insert enough saturated waste to properly lubricate the journals.

MR. BUSH : In that connection the question might be asked, Why is it that on Mr. Ball's road they have obtained so much better results with the use of saturated waste than with the oil can? I think Mr. Schroyer's remarks on that point are very pertinent indeed. He suggests that with the very contracted space for supplying oil it is not possible to get the spout of the oil can back to the rear of the journal where the oil is most needed, and on the great majority of railroads, in fact I think you might say on all roads where the oil can is used, it is done as Mr. Schroyer suggests, the oil is just put in at the front ; it does not get back to the rear of the journal.

THE PRESIDENT : If there is no further discussion, we will proceed to the next subject, which is No. 3—Square Bolt Heads and Nuts; Standard for Pipe Fittings. This is a joint committee with the Master Mechanics' Association. Mr. Schroyer is chairman.

Mr. Schroyer read the following report :

REPORT OF COMMITTEE ON SQUARE BOLT HEADS AND NUTS:
STANDARDS FOR PIPE FITTINGS.

To the President and Members of the Master Car Builders' Association :

Your Committee on Standard Pipe Fittings and Square Head Bolts and Nuts, to act jointly with a committee of the Master Mechanics' Association, finds it necessary to report progress, and asks to be continued for another year. After meeting and conferring with the members of the committee of the Master Mechanics' Association, it was decided that the object for which these committees were appointed could not be attained without concerted action of the members of the principal societies of mechanical officers and the co-operation of manufacturers of pipe and fittings.

In the line of our work, Mr. E. M. Herr, chairman of the Master Mechanics' Association, addressed a letter, under date of November 16, 1897, to the secretary of the American Society of Mechanical Engineers, as follows:

"DEAR SIR,—The attention of the American Society of Mechanical Engineers is directed to the lack of uniformity in the sizes of pipe fittings manufactured by different makers in various parts of the country.

"This has been brought forcibly to the attention of the undersigned, and others interested in the mechanical department of railway work, by the trouble, delay and consequent expense caused by pipe unions purchased from different dealers for the same purpose not being interchangeable. The same also is true of pipe threads themselves, although the lack of uniformity is not so great. This subject has been deemed of sufficient importance by the American Railway Master Mechanics' Association and Master Car Builders' Association for the appointment of a joint committee on this and the related subject of standards for square bolt heads and nuts. Inasmuch

as the desired uniformity can only be secured by concerted action of the large purchasers and consumers of bolts and nuts, pipe and fittings, and those engaged in their manufacture, it would seem desirable that the American Society of Mechanical Engineers should, at the next meeting, appoint a committee to consider these subjects, confer with the committee of the Railway Association, and endeavor to secure the appointment of a committee representing the manufacturers, with the object of securing the desired uniformity.

"As an example of the present condition of affairs, the diameter and number of threads on union nuts of one-inch pipe fittings, made by seven different manufacturers, are given below :

No. of Threads.	Diameter of Threads.	
11	2.	inches
12	1.875	"
11 ½	2.	"
11 ½	1.97	"
12	1.875	"
11 ½	1.8906	"
11 ½	2.1718	"

"Yours very truly."

This was presented at the New York meeting of that society, held December 3, 1897, and the following resolution passed :

"Resolved, That the American Society of Mechanical Engineers, having received and considered the suggestion of Messrs. E. M. Herr, W. H. Marshall and C. H. Quereau on the subject of securing uniformity in the threads of coupling unions for pipe, approve of the suggestion that the society should appoint a committee to consider this question in joint conference with similar committees of the American Railway Master Mechanics' and Master Car Builders' Associations, and refer the appointment of such committee to the council, with power."

On April 7 last a joint meeting of the chairman of the Master Mechanics' committee and representatives of the American Society of Mechanical Engineers was held in New York, and a plan agreed upon, which, it is believed, will accomplish the object for which the joint committee was appointed. This will require considerable time, as it includes the designing of a complete line of pipe fittings, which can only be satisfactorily done after taking the matter up with the other manufacturers of pipe fittings, and giving careful consideration to this side of the question. The members of the committee of the Master Mechanics' Association have taken up the work more especially of pipe fittings, while the members of your committee are working on the subject of square-head bolts and nuts. After canvassing the situation at a joint meeting of the two association committees, we have thought it best not to make any report at this meeting, and ask that the committee be continued until next year, when we think we will be able to make a satisfactory report, and in so doing get the co-operation of the American Society of Mechanical Engineers and the manufacturers of bolts, nuts, pipe and fittings.

Respectfully submitted,

C. A. SCHROYER,
W. H. LEWIS,
THOMAS FILDES,

Committee.

CHICAGO, June 3, 1898.

MR. JOHNSON: I move you, Mr. President, that the report be received and the committee continued until next year, as requested.

The motion was carried.

THE PRESIDENT: The next will be No. 4 — Specifications for Air-Brake Hose. Mr. Waitt is chairman.

Mr. Waitt presented the following report :

REPORT OF COMMITTEE ON SPECIFICATIONS FOR AIR-BRAKE HOSE.

To the President and Members of the Master Car Builders' Association:

Among the parts of railway cars which are short-lived and therefore require frequent renewal, air-brake hose take a prominent rank. If it is considered that there are over 650,000 cars and locomotives in this country at the present time equipped with air brakes, and that the highest guarantee given on the life of air hose by manufacturers is only twenty-four months, and that a large percentage of the air hose are renewed for defects not inherent in the hose before they are twenty-four months old, it will be seen that the railways of this country require probably over 600,000 air-brake hose, costing with present prices almost, if not quite, \$1 each, to supply the requirements for yearly renewals. With this large continuous expense, to say nothing of the cost of hose used in additions to equipment built each year, it would seem that in connection with this much overlooked part of our equipment there is a field for study, which may be productive not only of considerable economy in the yearly expenditures for supplies, but of saving by the reduction of delays to trains and prevention of collisions, which are many times due to the bursting of air hose.

At the present time, to quote a recent writer, "there seems to be no standard of quality to measure hose by and no generally recognized tests which can be made in the laboratory or in the shop which will give an approximation of the probable life of a hose. . . . There seems to be very little definite information obtainable from published accounts as to the methods of manufacture of hose, its composition and the service to be expected of it." It is with the hope of creating greater interest and deeper investigation on the subject of air hose that this paper is prepared. In order to throw further light on the subject and encourage the use and enforcement of carefully prepared specifications for air hose, it may be well first to briefly describe the materials and processes which enter into air-hose manufacture.

The character of air hose depends largely upon the quality of the rubber and fabric used, but more especially upon the methods by which they are combined in manufacturing. The use of good materials alone is not a guarantee of the production of high-class air-brake hose. Judging from past practice on most of our railways, it has been assumed that almost anything that bore the name of air hose was a satisfactory and safe article for use on railway equipment. Much attention has been given by many roads to preparing carefully worded specifications and making extended tests, in connection with other classes of material used on railways, but it is only within the past two years that much, if any, attention has been given by any of the railway companies to the consideration of what is necessary in order to have

a safe and economical air-brake hose. This is, perhaps, largely due to the fact that it is only within the past two or three years that any very large percentage of our equipment has been equipped and operated with air brakes.

There is a general impression that the strength of an air hose to resist bursting is the one great requisite. It is a fact, however, that almost any hose in the market will withstand an initial bursting pressure many times greater than the maximum strain put upon it in ordinary use. A large number of experiments made by the writer have shown that many of the poorest grades of hose will stand a bursting pressure far in excess of that passed by hose which are known to be of much better quality.

There seems to be a generally accepted opinion, but without any good reason therefor, that it is necessary for an air-brake hose to be made four-ply—that is, composed of four wrappings of heavy cotton canvas—in order to make it of sufficient strength to stand the strains put upon it in service. Tests made, by bursting a large number of hose of various plies and various styles of manufacture, have shown that four-ply air hose are made which will burst at 400 pounds pressure, while other hose made with only two-ply fabric, but manufactured by a different method, cannot be burst at pressures of over 1,200 pounds. The examination of many hundred good quality condemned hose, removed from cars on account of being defective and leaky, has shown conclusively that but very few of them have been removed on account of weakness of the fabric itself. In the construction of an air hose, the canvas or cotton fabric can be considered as the foundation upon which the structure is built. On the fabric alone reliance must be placed for strength to resist the pressures that are put upon it. In general engineering design and construction, it is considered good and safe practice if a factor of safety of five is used. With an air-brake hose on freight cars, 90 pounds is about the maximum pressure that they are called upon to resist. If hose are specified to stand a bursting test of 500 pounds, a factor of safety of a little over $5\frac{1}{2}$ pounds is thereby required, which seemingly should be amply high for all requirements. Nevertheless, specifications that have been submitted to manufacturers are calling for a bursting pressure of 600 and even 900 pounds to the square inch.

The rubber used in the construction of an air hose is placed there for the purpose of furnishing an air-tight and moisture-proof covering inside and out, and to aid as a protection to the fabric which forms the basis of the manufacture. It is also used as a means of tying together the various wrappings which make up the hose.

The fabric foundation of air-brake hose is made of cotton; of this material there are several varieties. The first and highest-priced grade of cotton is known as "Sea Island." "This is a distinct variety having a longer fiber than any other, which renders it stronger in proportion to the weight than cotton of short fiber. It is claimed that it possesses superior strength apart from its longer fiber. By means of careful selection of the raw cotton, combined with improved methods of manufacture, fabrics are now produced with Sea Island cotton which have a strength, compared with fabrics made of equal weight of ordinary cotton, indicated by the ratio of about one hundred to fifty." Sea Island cotton is generally used where great strength is required with very light weight. This is not the case with air-brake hose; therefore, Sea Island cotton is rarely ever called for or used in the construction of air hose. The next grades of cotton are known as the "Gulf" and "Peeler"; it

is from the latter that much of the fabric used in air-brake hose is made up. Peeler cotton has a medium length of fiber and medium strength, and where it is desirable to have as much cotton and as little rubber as possible in the construction of the hose, on account of producing it at as low cost as possible, Peeler cotton is found to be entirely satisfactory for use. As to the grade of cotton that has been used in manufacturing a hose that may be submitted for examination, possibly even an expert would find difficulty in determining it.

Rubber is produced from several localities. It is in its first state a sticky exudation from the rubber tree, having a similar relation to that tree to that which pitch has to pine trees. The principal varieties of rubber gums, each of which has many grades, are Para, Central, East Indian and African. Para rubber, as the name would indicate, comes from South America. Fine Para, which is the best quality of rubber, costs at the present time from 90 to 95 cents per pound. This rubber is used for making the highest grade of rubber goods. The rubber bands that we use in our offices, and the rubber cord that is used in the woven fabric in suspenders and in congress boots, is made of fine Para rubber. Some manufacturers use a certain quantity of this high-grade rubber in air-brake hose, but generally the coarse Para rubber, costing at the present time from 60 to 70 cents per pound, is used. This is the same kind of rubber as the fine Para, except that less care is taken by the natives in collecting it, and it is found to be mixed with a great deal of dirt, which has to be separated and which detracts somewhat from its qualities, although in the process of manufacture the dirt is almost entirely washed out.

Para rubber comes to this country in the form of balls, weighing anywhere from six to one hundred pounds each. These are dark-colored with a rough outside surface, and have a hole through the center about one and one-quarter inches in diameter. These rubber balls are formed by the natives taking a stick and rolling it over in the sticky gum, in the same way that a boy would roll a snowball over and over in the moist snow in order to obtain one of larger diameter. On cutting open a ball of fine Para rubber it will be found quite white on the inside and free from dirt; a ball of coarse Para will be found with white streaks of clean rubber mixed with considerable black dirt.

The Central gums, as the name would indicate, come from Central America; these come most frequently in the shape of slabs or strips. They cost at the present time from 55 to 60 cents per pound. These gums are softer than the Para, and are not as tough and strong.

East Indian gums and the African gums are a lower grade; the African gum especially in some grades being very soft, so much so, that in its crude state, as brought to this country, it will run like molasses candy in a warm room, and shape itself to whatever vessel it is placed in. The African gums as a rule have very little strength, and are low-priced, some grades costing at the present time less than 30 cents per pound. These softer gums are not good for mechanical purposes.

In the manufacture of air-brake hose, a few manufacturers deem it necessary to use nothing but fine or coarse Para gum, although some have found it satisfactory and productive of good results to use a small amount of the softer Central and even the better grades of African gums in connection with the Para.

In the examination of a hose, even an expert would hardly be able to tell whether there had been a small quantity of the softer gums used or not. Any very

large quantity would be shown from the fact that the rubber would not have the necessary toughness and elasticity. Rubber in its pure state cannot be used as a foundation for air hose. It has doubtless been noticed by many that the rubber bands that we have in our offices, after an exposure to air and heat for some months, especially if stretched, lose their elasticity, and on further stretching are easily broken; they seem to become hardened and brittle on the surface. These bands are made from the highest quality of pure Para rubber, free from much adulteration. If rubber of the same compounding was used for air-brake hose, it would, after a few months' exposure to heat and cold and moisture, become brittle, and the hose would be short-lived. In order to obtain satisfactory results, the rubber in its crude state has to be compounded with certain mineral products. Among the materials used for compounding are whiting, litharge, oxide of zinc, magnesia, graphite, oxide of iron, and always a certain amount of sulphur, which is necessary in the process of curing or vulcanizing. The knowledge of the best proportion of the different ingredients used in compounding forms one of the secrets of the trade, and is a point that can only be learned as the result of many years of study and experiment. Many times, the difference in the compounding will be the prime cause of the success or failure of one or another of the different samples of air-brake hose furnished by manufacturers.

I may say here that efforts have been made to use, in air-brake hose, various substitutes for fine grade rubber. Some of the substitutes are chemically compounded from cheap gums, others are made from reclaimed stock made from old rubber boots and old hose which have been ground up and the fabric burned out by means of acid. The use of these substitutes can always be prevented by properly prepared specifications, outlining certain known safe requirements as to the stretching and permanent set in the rubber used.

In the manufacture of air-brake hose the coarse Para rubber, in balls, is first soaked in a large vat filled with hot water about a half-hour, until it becomes somewhat soft; this is done so that the dirt will be loosened and come out readily in the succeeding operations. With fine Para the soaking is not absolutely unnecessary. After soaking, the balls of rubber are cut in several pieces for convenience in size or handling. These pieces are next passed into the washer, which is a machine having two closely set metal drums or rolls from fourteen to eighteen inches in diameter, the drums being generally fluted or having deep grooves in them. One of the rolls runs at a somewhat higher speed than the other. The pieces of rubber are passed between the rolls, the difference in speed and the fluting or grooving of one or both of them having the effect of breaking up and tearing them apart, allowing the dirt to drop out. During this process, hot or cold water is allowed to run on the rubber. After being put through this mill for a half-hour or more, the result is that the rubber has been formed into sheets four feet or more long and two feet or more wide, from which the dirt is almost entirely removed. After this grinding and washing process, the sheets are hung up on racks in a hot room to dry, and left there for two or three weeks, or even longer. When the sheets are first put in the drying room, they are, with some grades of rubber, quite light-colored, but when thoroughly dry they are found to have turned quite dark. On being removed from the drying room they are passed through a mill to be "broken up." This mill consists of two closely set smooth rolls about eighteen inches in diameter and three feet or more long, one of which runs faster than the other, thereby giving a rubbing

motion. As the rubber is passed between these rolls, which are kept hot, the rough porous sheets are squeezed into smooth, homogeneous sheets about an inch in thickness, composed of pure rubber. These mills for "breaking down" require a large amount of power, amounting to from twenty-five to fifty horse-power. The sheets are run through this mill over and over again, until they become homogeneous, which takes, for thirty or forty pounds of rubber, about one hour's time. After being thoroughly broken down, the sheets of pure rubber are next taken to another mill similar to that used in the previous process, where the compounding takes place. This compounding is done in accordance with the grade of the rubber. A certain amount of sulphur is always added, which is removed later in the vulcanizing process in the shape of gas. Whiting is the general base for compounding. In good air-brake hose the proportion of mineral to pure rubber varies from thirty-three to fifty per cent. If a small amount of cheaper grade rubber or rubber substitute is to be introduced with the pure Para for air-brake hose, it is introduced during the compounding process. The rubber sheets are run through the mill over and over again and the mixture of minerals forming the compound is shoveled onto the rubber, and in passing through the mill, one of the rolls of which revolves at a higher speed than the other, the mixture is made perfectly in about twenty minutes' time. If the compound was not added to the rubber, it would be found impossible to work it into sheets and the various shapes for which it is wanted. After compounding, the rubber generally stands a day or two, and then is passed to the calender. This is a heavy, three-roll machine, where the rubber is passed between large hollow steel or iron rolls which are about two feet in diameter and from three to four feet long. The rolls are always kept hot by means of hot water or steam inside. If it is desired to roll the rubber into sheets, the two upper rolls between which the rubber passes are geared to run at the same speed, and they are forced as near together as is necessary to pass the rubber through at the required thickness. These rolls will pass the rubber out at one-thirty-second or one-sixty-fourth inch or less in thickness in sheets three or four feet wide. After passing through the rolls, the thin sheet of rubber adheres to the lower of the two rolls, and by virtue of stronger adhesion is caught on a long roll of cotton cloth, which at the same time is passed through between the middle and lower roll, and is afterward rolled up on a small spindle located near the calender. The cotton cloth is used to keep the rubber sheet from sticking together as it is rolled up. The rubber is in such a state when passing through the calender that if two pieces of it came together they would unite firmly, and there would be great difficulty in separating them when wanted for use later in the process.

Sheets of proper thickness as just described are used for the tube and cover of the hose, and also for the skimming sheets that go between the various wrappings of duck or fabric where a thickness of one-sixty-fourth inch or more is required.

In making the ordinary form of wrapped hose, cotton canvas coming in rolls generally about forty inches wide is unrolled and passed over a hot drum or over steam pipes to thoroughly dry out any moisture. This canvas is then passed through between the calender rolls previously described, one of which is geared to run at a higher speed than the other. Above the canvas, compounded rubber is passed through between the same rolls, and the friction caused by the upper roll running at a higher speed than the lower breaks in the rubber and forces it down into the grain.

of the fabric; the pressure being so great that in many cases it is forced way through to the other side, filling all the pores and making the fabric practically air and water tight. After this operation, which is termed "frictioning," has been done on one side, the canvas is then passed through the rolls a second time for frictioning on the opposite side, after which it is ready for the skimming coat or covering of thin rubber which is to be applied between the different plies of wrapping. In all these processes the rolls in the calender are kept hot by means of hot water or steam inside of them.

The skimming of the fabric is done on the same style of calender rolls as is used for the sheeting and frictioning. A sheet of one-sixty-fourth or thirty-second inch thick rubber made as before described is passed through between the rolls of the calender, at the same time with the frictioned canvas, and the thin coating is thereby firmly joined to the canvas on one side. All the material is now ready for putting the hose together. There are several different ways in which wrapped hose are put together. In some factories it is considered the best practice to make up the hose individually. In others they are made two at a time on a mandrel and in still others some twenty or more are made at a time on a long mandrel. Each form of manufacture has its advocates, and first-class hose are known to be made in each of these ways. I will first describe the manufacture where long mandrels holding twenty or more at a time are used.

First, the sheets of duck with a skimming coat on one side are laid with the coated side up on long tables covered with zinc, and they are cut on the bias to proper sizes for wrapping hose. The rubber stock for the tube and cover is also laid out and cut to the needed size. The tubes are, by the best manufacturers, made of two or three calenders or thicknesses of thin rubber sheets. The stock may be made up for this in advance, by passing two or more sheets of thin rubber one-thirty-second inch or less thick through the calender rolls at the same time, uniting them one to the other; or it may be done when the hose is rolled on the mandrel, by having the rubber wide enough to roll the mandrel over it two or three complete revolutions. By making the tube in this manner, i. e., of two or three calenders of rubber, if there should be a little dirt or a pin hole in any part of one of the thin sheets it is sure to be covered up by the next sheet, and thereby imperfections which allow air or moisture to pass through are sure to be avoided. Where the tube is made of one calender of rubber of greater thickness, imperfections are very likely to occur, which are sure to shorten the life of the hose and make it liable to leak. Tubes are sometimes made in a machine by forcing properly compounded rubber through a proper sized opening around an inner spindle, thus producing a long rubber tube which may be cut to desired lengths. Tubes so made are very regular in thickness when first made; but if there is a little sand or dirt in the tube which drops out afterward, or if the tube is carelessly handled in the after processes, there is a likelihood of its being much thinner at one part than another, or there may be a small pin hole through it from dirt falling out afterward which may not be detected. In the writer's opinion there are such strong objections to machine-made tubes for high-grade air hose that I will only describe the use of the handmade tube.

A long sheet of the double or triple calendered tube stock of proper width to roll is laid out on the table; except on one edge, soapstone is rubbed over the surface of the rubber to prevent its sticking to the mandrel. The mandrel is then placed on

the rubber tube sheet, and the edge of the rubber which is to lap is cleaned with a piece of rag dipped in naphtha, so that there will be no dirt or any other substance on the edge to prevent its adhering firmly where lapped. The mandrel is next rolled over by hand on the tube sheet and is covered by it, the tube lapping one-quarter inch or more at the joint. This lap is then gone over for its entire length with a concave roller, so as to make sure that the joint is firmly united and all air excluded. The tube being thus applied, canvas strips frictioned on one side and skimmed on the other are next cut on the bias to the right width and length for wrapping the necessary number of times about the tube and cover, and are laid under the tube-covered mandrel, spaced about one-quarter inch apart to allow room for the caps on the end of each hose. The mandrel is then rolled over them the necessary number of times to give the two, three or four ply of wrapping. During and after this process the whole is gone over with concave rollers, so that the canvas wrapping with its rubber coat will be firmly united and all air excluded. Following this process, sheets previously cut to the proper size for forming the cover are applied in the same manner as the tube. The result of the above processes is a mandrel about fifty feet long with a series of uncured rubber hose on it spaced about one-quarter inch apart. A rubber strip about one-quarter inch thick is placed between each of these sections to form the cap on the end of each hose. Next the labels are applied. These labels are first stamped out on thin tin or aluminum sheets; they are then coated on underside with soft white or red rubber, which is pressed into the depressions. These labels are laid on each hose at the proper place and pressed down so as to make them adhere. The mandrels with the hose are next put in a machine which revolves them, and commencing at one end and going to the other, they are wrapped on the bias with long strips of wet cloth about three or four inches wide, the wrapping being done very tightly. After this the mandrel with the wrapped hose is put into a long iron cylinder and a steam-tight cap is put on the end of the cylinder; then steam at a pressure of about thirty-five pounds to the square inch is admitted to the cylinder for about two hours, during which time the vulcanizing or curing takes place. The time of vulcanizing varies somewhat in accordance with the compounding of the rubber. After the vulcanizing is over the mandrels are removed from the vulcanizer, and after cooling slightly are unwrapped; then by means of an ingenious connection, compressed air is forced between the mandrel and the hose, and the hose are easily stripped off for the entire length of the mandrel. They are next cut to proper length by means of a toothless saw, kept moistened with water, the cutting being done in the center of the rubber pieces that are put in for caps. Thus the hose are left in sections about twenty-two inches long, each section of hose having a rubber cap vulcanized on, the thickness of the cap being from one-sixteenth to one-eighth inch.

Where wrapped hose are made in short lengths of one or two hose, the mandrels are supported at the ends a few inches above the tables. First the tube sheet of proper size is coated with soapstone, except at one edge which is cleaned with naphtha, and it is then placed on the mandrel and wrapped about it, the lap being rolled down with a concave roller. Next the wrapping sheets properly cut to size are applied to the tube and the mandrel revolved a little at a time, the surface of the adhering wrapping being gone over carefully with concave roller to make it adhere firmly, and to exclude any air bubbles; the mandrel is turned until the wrapping is entirely applied — two, three or four ply, as the case may be — after which the cover, cut to

proper size, is applied in a similar manner and the lap at the outer edge thoroughly rolled down. Thin rubber capping pieces are applied at each end of each hose just before the cover is applied. The hose is next labeled, wrapped tightly with cotton cloth, and vulcanized in the same manner as before described where a larger number of hose are made together. Where hose have enlarged ends the enlargement is sometimes formed by having corresponding enlarged portions on the winding mandrels, which enlarged parts are so constructed as to slip off when hose is removed from mandrel. Another method is to make the enlargement after the hose is made in the ordinary way, but before vulcanizing, by forcing a tapered metal expander into each end and allowing the hose to go into the vulcanizer with this expander in the ends. The ends retain their enlarged shape permanently after the vulcanizing.

During the past two years a new style of hose known as the tubular construction has been quite largely introduced. As I shall have more to say of this form of construction later on, and as its method of manufacture is in some respects radically different from the wrapped hose, it will doubtless be interesting to follow the process. In the tubular form of hose it seems to be quite convenient to make them on mandrels of sufficient length to produce two hose at a time. The mandrel is hollow, about five feet long, and of diameter suited to the inside diameter of the hose. A sheet of thin rubber for the tube is cut to proper length for two hose, and of proper width to wrap around the mandrel two or three complete turns. This sheet is laid on a perfectly flat and smooth table, and the mandrel, well soapstoned, is laid on it and rolled over it two or three times, thus forming the tube, the lapping edge afterward being rolled down with concave roller. The mandrel with its tube cover is next placed in position in center of a weaving machine similar to that used in making tubular lamp wicking, and while in this position a cotton covering is woven around it, the mandrel being fed through the machine at same speed that fabric is woven. The tightness of fit of tube and the closeness of weaving is perfectly adjustable, as well as the thickness of the fabric, which can be varied by increasing the number of threads used. After the first layer of fabric is woven, the inclosed mandrel is placed on a rack over a trough filled with rubber cement. The newly woven tube is first given a thorough coating of very thin rubber cement, and after this is sufficiently dry several succeeding coats of greater density are applied, proper time for drying being allowed between the coats. This process completely fills all the pores of the fabric, excludes the air, and cements the fabric together, and to the tube, and also provides an adhesive surface for the friction coat. After the cement coats are applied the mandrel is placed on the table and a friction coat of rubber one thirty-second or sixteenth inch thick is applied in the same manner as the original inner tube, the lapping edges as well as the balance of the covering being carefully rolled down so as to exclude all air. Next, another tube of fabric is woven over the rubber friction coat, and again the texture of the fabric is filled with rubber cement as before, after which the cover is applied in the usual way. The hose are now cut to proper lengths while on the mandrel and a thin rubber cap piece is applied at each end. If the hose are to have enlarged ends, expanders are forced in, labels applied, and the hose is then ready for the usual wrapping in wet cotton cloth and the subsequent vulcanizing.

In describing the process of hose manufacture I have not attempted to describe every minute detail, nor have I noted the many variations in minor matters that are

adopted by each manufactory to suit their own ideas and convenience. The fundamental and more important manipulations in general use have, however, been described.

The use of inferior materials in hose manufacture, combined with the greatest care in the process of construction, or the use of the best material with carelessness in putting it together, is sure to produce hose which will give unsatisfactory service and short life. With the object of ascertaining what steps have been taken by the railroads represented in this Association to insure proper materials and processes of manufacture in the construction of air hose, and also with a view of ascertaining what qualities of air hose are being accepted and used by the railroads, a circular of inquiry was sent out to representative members of our Association, asking for copy of specifications under which their hose are purchased, and the qualifications required by tests before acceptance, also a sample of hose purchased was asked for. Very few replies were received — only twenty-two out of the entire number of roads represented. The reason for this may be inferred from the nature of some of the replies, namely, that no attention whatever has been given to the subject by ninety per cent of our companies. That it should have instant and urgent attention is shown by the results developed in tests of twenty-six sample hose received for test. These were of eight different makes, and undoubtedly of greatly varying prices. They range in quality from first-class down to the grade of common cheap garden hose, made largely of reclaimed rubber. Only four of the manufacturers represented had furnished to the railroads hose which, in the matter of good friction and good rubber properly cured, would meet the requirements of the specifications of the Lake Shore, Erie and Baltimore & Ohio railroads. Having referred to the requirements of the specifications of these three roads, it may be of interest to note the detail of such specifications, which are all practically alike in the tests required to show the friction and the qualities of the rubber. As I have not received in reply to circular of inquiry copies of the full present specifications of two of the above mentioned roads, I will give that by which the Lake Shore & Michigan Southern Railway have been purchasing hose for some time, which is as follows :

THE LAKE SHORE & MICHIGAN SOUTHERN RAILWAY COMPANY.

CAR DEPARTMENT.

SPECIFICATIONS FOR AIR-BRAKE AND SIGNAL HOSE.

1st. All air-brake and signal hose must be soft and pliable, and not less than 2-ply nor more than 3-ply. They must be made of rubber and cotton fabric, each the best of its kind made for the purpose. No rubber substitutes, reclaimed or old rubber stock or short fiber cotton to be used.

2d. The tube must be handmade, composed of three calenders of $\frac{1}{2}$ -inch rubber ; it must be free from holes, or imperfections in joining, and must be so firmly united to the cotton fabric that it cannot be separated without breaking or splitting the tube. The tube must be made of high quality of rubber, and must be of such composition as to successfully meet the requirements of the stretching test given below. The tube must not be less than $\frac{3}{8}$ inch thick at any point. It may preferably be

made in composite form, with a complete inner tube of $\frac{1}{8}$ -inch rubber wrapped with a single wrapping of 8-ounce cotton canvas, the whole being covered with an outer tube of $\frac{1}{8}$ -inch thick rubber.

3d. The canvas or woven fabric used as wrapping for the hose to be made of long fiber cotton, loosely woven, and to weigh not less than 22 ounces per yard, and to be from 38 to 40 inches wide, except when woven with a seamless tubing. The wrapping must be frictioned on both sides, and must have in addition a distinct coating or layer of gum between each ply wrapping not less than $\frac{1}{32}$ inch thick. The friction and coating must be of the same quality of gum as the tube. The canvas wrapping to be applied on the bias.

4th. The cover must be of the same quality of gum as the tube, and must not be less than $\frac{1}{8}$ inch thick. The cover may preferably be made in composite form in the same manner as provided for with the tube. In this case there must be not less than $\frac{1}{32}$ inch thickness of rubber between the outer ply of wrapping and the 8-ounce duck forming part of the cover, and there must be an equal thickness of rubber on the outside.

5th. Air-brake and signal hose are to be furnished in 22-inch lengths. Variations exceeding $\frac{1}{4}$ inch in the length will not be permitted. The inside diameter of all such hose to be not less than $1\frac{1}{4}$ inches nor more than $1\frac{7}{8}$ inches, except on the ends, which are to be enlarged to $1\frac{7}{8}$ inches for a distance of $2\frac{3}{4}$ inches, the change from larger to smaller diameter to be made tapering, so that inside of hose will be perfectly smooth. The outside diameter must not exceed 2 inches, nor be less than $1\frac{7}{8}$ inches in the main part, or exceed $2\frac{3}{8}$ inches, or be less than $2\frac{1}{8}$ inches at the enlarged ends. Hose must be finished smooth and be regular in size throughout, as above indicated; ends of hose to be capped with from $\frac{1}{8}$ to $\frac{1}{2}$ inch of rubber. Caps must be vulcanized on, not pasted or cemented.

6th. Each standard length of hose must be branded with the name of manufacturer, year and month when made, and the standard, L. S. & M. S. R'y mark, thus:



and also have a table of raised letters at least $\frac{1}{8}$ inch high, to show date of application and removal, thus:

97	A	1	2	3	4	5	6
98		7	8	9	10	11	12
99	....	.....	.....	.....	.....	.....	.....
00	R	1	2	3	4	5	6
01		7	8	9	10	11	12

All markings except the road mark may be combined in one plate.

All markings to be full and distinct, and made on a thin layer of white or red rubber, vulcanized on, and so applied as to be removable only by cutting with a knife or sharp instrument.

7th. Air-brake and signal hose will be subjected to the following tests:

Each hose must stand a proof pressure test of 300 pounds without failure of any kind. With every lot of 200 or less shipped to one point, the manufacturer must furnish free of charge one additional hose for test. From each such lot one hose will be taken at random, and subjected to the following tests in the order named:

BURSTING TEST.

The test hose must stand a pressure of 500 pounds before bursting.

FRICTION TEST.

A section one inch long will be taken from any part of the hose, and the friction determined by the force, and time required to unwind the hose; the force being applied at right angles to the line of separation. With a weight of 25 pounds suspended from the separated end the separation must be uniform and regular, and when unwinding the average speed must not exceed 6 inches in 10 minutes.

STRETCHING TEST.

A 1-inch section of the rubber tube or inner lining will be cut at the lap or thickest part. Marks 2 inches apart will be placed on it. The 1-inch strip will next be stretched until the marks are 10 inches apart, and then released immediately. The piece will then be remarked as at first, and stretched to 10 inches, or 400 per cent, and will remain stretched 10 minutes. It will then be released and the distance between the marks measured 10 minutes after the release. In no case must the test-piece break from defective quality of rubber, or show a permanent set of more than $\frac{1}{4}$ inch between the 2-inch marks.

Small strips taken from the cover or friction will be subject to the same test.

8th. If test hose fails to stand the required tests, the lot from which they are taken will be rejected without further examination. If test hose are satisfactory, the entire lot will be examined, and those complying with the requirements herein set forth will be accepted. All rejected hose will be returned, the shipper paying freight charges both ways.

When any shipment of hose, made subject to these specifications, is received, one sample is taken at random from different parts of the shipment for every two hundred hose furnished. The sample hose are first subjected to a bursting pressure. In making bursting test, a hydraulic hand pump capable of attaining a pressure of fifteen hundred pounds is used. The test hose has fittings applied in the usual way, and is screwed on to the connection from testing machine; an ordinary Westinghouse coupling closed at the nipple end, but having a small pet cock inserted, is coupled to the test hose. The pet cock is opened and the free end of the hose slightly elevated, while the hose is being pumped full of water, so that the air is allowed to escape. The pet cock is then closed, and the pressure increased till the hose bursts, when the reading of pressure gauge is taken. If the hose successfully resists a pressure of five hundred pounds, a section one inch long is cut from some part not near the rupture, and by means of a knife the outer cover is cut through to the first

wrapping of duck or woven fabric, and with the aid of a pair of pliers this outer course is separated from the balance for about one inch. A convenient clamp is next attached to the free end, and the section is slipped as far as possible onto a slightly tapered wood or metal spindle, which has an outer diameter about the same as inside diameter of hose. This spindle is placed in its position in a friction-testing machine, which is shown in Fig. 1, and a twenty-five-pound weight is suspended from the separated end by means of the clamp. The distance that the hose unwraps in ten minutes determines if the friction meets the requirements. As lack of care in the process of manufacture, or the peculiarities of construction of the hose may make the unwrapping take place more rapidly between the first and second courses than between the cover and the first course, it is desirable to first take record of distance unwrapped and the time on the first course, and then a second test in similar manner on the friction of the inner course.

After the 1-inch section is unwrapped to the tube, if made in the best manner, it should be found very difficult to separate the rubber of the inner tube from the canvas wrapping. A little experience, however, aided by a few drops at a time of naphtha, will enable the separation of rubber tube, rubber cover, and even the friction skimming coat, all of which are then tested in the stretching testing machine shown in Fig. 2. The method of testing the strips of rubber is clearly detailed in the specifications. If the test hose successfully passes the friction and stretching tests, all of the hose in the shipment are examined to note their compliance with the balance of the requirements.

The two testing machines illustrated are subject to slight variations in construction, but have proven amply accurate and convenient for the work. As the work of hose-testing must in most cases necessarily be left to subordinates, it is desirable to have a complete and simple record of the results, and one that will at a glance indicate to the head of the department the comparative conformity to the specifications of the different hose tested. For this purpose a record book made by the blue-print process, and bound in self-binding covers, has been found highly satisfactory. A blank sheet from such a record book used on the Lake Shore road is shown in Fig. 2. In filling in the sheet the data, when correct to specifications, is entered in black ink, and when incorrect in red ink, thus calling attention at a glance to the deficiencies in the hose tested.

The Lake Shore air-hose specifications do not by any means pretend to be a final form of specifications that embody all the necessary points for obtaining the best possible air hose. They do, however, if lived up to, make it very nearly impossible to have poor hose furnished under their restrictions. The materials in order to pass the test must be of high quality, and the workmanship must be good, as well, and as only a few manufacturers are furnishing hose at present which are up to this standard, it would appear to be in the line of progress and economy and improvement of service for all companies to adopt some such requirements in their purchases. Especially is it economy when it is known that poor grade hose are shortlived, and that the car owners have to pay for nearly all renewals of air-brake hose on their cars, whether at home or on other lines.

In order to properly pass judgment on the necessity of the requirements in the specifications that will later be suggested in this paper, I desire to enter briefly into a discussion of some of the qualities of air hose and their component parts; and of

some of the methods of manufacture, as well as some of the more prominent defects in hose which should be provided against if possible.

The scrap pile is always a good and fruitful field for observation as to causes of weakness or removal of defective parts of equipment. From the hose scrap pile we find prominent among the causes of disability among hose:

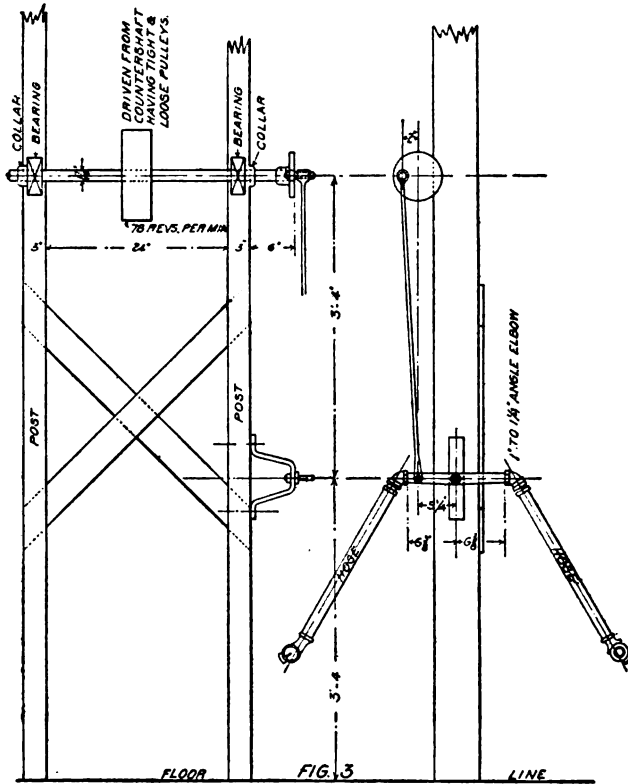
1st. Kinked, with rubber of cover badly cracked at kink, exposing canvas to the weather and causing leakage. In these hose it will often be found by opening up the hose that the rubber in the tube is cracked near the kink, and there is nothing to prevent moisture inside the hose from working into the canvas and following it round and round till it reaches the outside of hose. Where the moisture goes the air can follow, hence from this cause we may have many leaky and burst hose. Whenever the protection of the inner tube is lost or interfered with by its being cracked or punctured, the near condemnation of the common form of four-ply wrapped hose is at hand, for the moisture and air pressure will soon work its way out. There is far less danger from the cracking of the cover, as there is no air pressure to help force the moisture inward. Another effect of kinking is to cause a separation between the different layers of the hose, and also to break the fiber of the cotton in the canvas and weaken it at that point.

2d. Porous or leaky around the ends of the hose near fittings. An examination of the interior of such hose after the fittings have been carefully removed will show in a large number of cases that the rubber tube has been slightly torn or cut, either wholly or nearly through the canvas, caused by bruising of tube in forcing the fittings on carelessly, or by cutting of tube by roughness of the fittings. Sometimes the hose seems porous all over. In every case of a porous or leaky hose, the tube is cut or cracked from this or some other reason. In some cases I have found the tube made of rubber that seemed to have lost its life, and was brittle and full of cracks; in others, especially those having machine-made tubes, or one calender handmade tube, there have seemed to be one or more small holes through the tube, where, either from grains of dirt or grit dropping out, or some other cause, the tube was punctured from the inside.

3d. Chafed or cut by chafing. This is a quite common cause of hose removal. It comes from being hit or rubbed, generally at the nipple-fitting end, thereby bruising or cutting the cover, sometimes into the first or second ply of canvas. This is, as a rule, a defect of less danger than has commonly been supposed, unless the cutting or bruising has cut the tube of the hose, and many hose removed for this defect will withstand a bursting pressure of several hundred pounds.

In order to avoid and prevent these and kindred defects from occurring in hose, as long as possible, certain qualities must exist in the hose when new. Hose must be soft and pliable in order to avoid kinking. It has for some unknown reason been the common practice in air-hose specifications and purchase, to call for nothing but four-ply wrapped hose. In some cases the weight of canvas is specified. Four-ply wrapped hose may be made so that it is reasonably pliable, but it is not an ideal form of construction for readily conforming itself to the swinging and bending it is subjected to in service.

The construction of ordinary wrapped hose is such that the rubber courses and the canvas wrappings do not work in harmony, when subjected to bending. This is very readily shown when such a hose is put on a kinking machine, such as is illustrated in Fig. 3. After the machine is put in motion, and the hose has been sub-



MACHINE FOR TESTING RUBBER HOSE BY KINKING

jected to a slight bending motion at a point near the inside end of the upper fitting, it will be found that at the point bent it becomes so heated in a few minutes that one cannot bear the hand on it. This shows that there is a condition in the structure which is not in harmony when subjected to bending. The rubber readily stretches and accommodates itself to the bent shape while the canvas is stiff and unyielding. This bending under such circumstances causes a change in the original relations of rubber and canvas, and a tendency to pull the rubber from the canvas, which in time cracks the rubber and separates it completely from the canvas.

There are forms of construction of hose in which the canvas and the rubber accommodate themselves with equal facility to the bending, as is shown by the fact that with such hose on the kinking machine there is no perceptible heating at the point of bend, and consequently no tendency to change the normal relation between the fabric and the rubber.

The form of construction last referred to is the tubular. Long-continued tests on the kinking machine have shown that the tubular form of hose will outlast from three to four of the best make of three or four ply wrapped hose, before showing a leak. Experience with such tests has failed to develop over thirty-three thousand revolutions of the machine with four-ply hose, before hose would commence to leak at the bend, while with the two-ply tubular hose it required a little over one million revolutions to cause a leak. Thus it seems to be quite clearly demonstrated that the tubular form of construction of hose seems to be the best adapted for softness and flexibility, and freedom from liability to kink and crack, or leak as a result of kinking.

Further tests of wrapped and tubular hose show that the best makes of four-ply wrapped hose will not show an average bursting pressure much over eight hundred pounds, while with the two-ply tubular they average over one thousand pounds. Thus strength as well as flexibility seem to be combined in the tubular form.

It has been stated that the tubular hose will expand and distort too much under pressure. Under a pressure of seventy pounds there was no perceptible difference shown as a result of many comparative tests; at a pressure of one hundred pounds in the four-ply wrapped they generally expand one-eighth inch in diameter, while the two-ply tubular expand three-sixteenths inch. In this feature the tubular construction as now made is subject to improvement, either by being made of three woven tubes, or with the double tubes more closely woven so as to prevent quite as much distortion.

Excessive expansion is objectionable. The hose is, during much of its service, under from seventy to ninety pounds pressure; if it expands, of course the rubber in it is stretched from its normal condition. It is a well-known fact that a piece of rubber hose will lose its elasticity and life much more quickly when held stretched than when free, and as a result of excessive expansion in the hose the rubber will soon lose its elasticity and will crack much sooner, thus shortening its life. In my opinion it is not good practice to allow air hose to be made in such a manner that they will expand over one-eighth inch under a pressure of one hundred pounds. The objection to excessive expansion, on account of its causing the rubber to crack more quickly, is a reasonable and strong argument for having hose made with enlarged ends. The ordinary $1\frac{1}{4}$ -inch hose is $\frac{1}{8}$ inch less in inside diameter than the small end of the Westinghouse fittings, and $\frac{3}{8}$ inch less than the enlarged part

of the fitting. It surely is not good practice to put rubber into the hose and then require it to be permanently stretched $\frac{3}{8}$ inch in diameter in order to force the fittings on, when with a little more work by the manufacturer the hose can have slightly enlarged ends which will take the fittings quite readily, and without stretching and straining the rubber and canvas, and thereby surely shortening its ultimate life. Another reason for enlarged ends is the fact that the air-brake fittings are unfinished malleable castings, which oftentimes have small rough or sharp projections on them, which are very liable to cut or tear the inner tube of the hose. With the ordinary wrapped hose, as soon as the tube of the hose is cut or punctured, there is a direct communication, by means of the canvas wrapping, for conducting moisture first and afterward air to the outer covering of the hose. It is the slight tearing or puncturing of the tube on new hose of the ordinary form which causes many of them to be shortlived. On some roads the fault has been entirely attributed to the use of a pneumatic tool for forcing the fittings into place. If the ends of hose had been enlarged, even with the pneumatic tool no harm would have ensued.

It is wise in the construction of the hose to provide a safeguard against the possible injury to the tube by placing a complete rubber dam between the tube and the regular canvas wrapping. This safeguard is provided by the ordinary manner of manufacture in the tubular construction, and it may be readily provided in the wrapped hose by making the tube of composite construction, i. e., have first an inner tube of two calenders of one-thirty-second inch thick rubber, which is wrapped with one layer of eight-ounce cotton canvas, and this covered with a wrapping of one-thirty-second inch of rubber completely separating the eight-ounce canvas from the regular canvas wrapping. If from any carelessness the inner tube is cut or torn, the cut will be unlikely to penetrate the eight-ounce canvas, and there will still be left an air-tight and water-tight protective outer tube, consisting of the eight-ounce canvas and its outer coating of one-thirty-second inch of rubber. This form of construction of tube has proven very satisfactory where it has been used. For very similar reasons, the outer cover made in composite form has given satisfactory results in preventing any slight chafing or cutting from allowing moisture to work its way inward, as the one-thirty-second inch thickness of rubber completely incloses the ordinary wrapping and forms a dam against the entrance of water, even when the outer rubber and eight-ounce wrapping in the cover is chafed away. Of course, if the composite form of tube and cover is used, in order not to exceed the proper outside diameter allowable with the usual size of hose clamps, the intermediate part of the hose between tube and cover can only be two-ply, if twenty-two-ounce canvas is used.

Quite extensive experiments have indicated to the writer that a simple two-ply hose, properly made with twenty-two-ounce duck, can be made strong enough in its resistance to bursting pressure, but it will not give safeguard enough against results of chafing of cover or tearing of tube. If, however, in addition, the composite cover and tube are used, a hose is obtained, if good materials properly put together are used, that is soft, pliable, and of sufficient strength to resist a bursting pressure of from six to eight hundred pounds.

With additional precautions taken, by specifying the maximum and minimum diameters allowable, and the additional safeguard that good rubber costs too much for manufacturers to use it in the place of canvas if it can be avoided, a specification

can safely and wisely permit the acceptance of hose of not less than two-ply, or more than four-ply. If not allowing two or three ply hose, an effectual barrier is erected against two styles of hose which, from all shop tests that can be applied to them, show themselves to be superior in flexibility and strength, as well as protective features, to the generally accepted four-ply wrapped hose.

There seems at present to be no standard set or method of testing adopted to determine the limit on the stiffness of hose. It would seem very desirable for some reasonable test to be devised for this purpose. As hose must in every layer be proof against air or moisture getting directly through from one layer to the next, the fabric must be made thoroughly air and water tight. In wrapped hose this can only be completely done by requiring the canvas to be frictioned on both sides, so that any pin holes which are unfilled with rubber on one side will be surely covered on the other. In only one or two instances has the writer obtained a satisfactorily high friction test in hose where the skimming coat between the wrappings was less than one-thirty-second inch thick, and as a sure protection, as well as a means of obtaining thickness of rubber which can be stripped off for testing, it would seem desirable to specify at least a one-thirty-second inch thick skimming coat.

In the previous part of the paper, reasons have been given for the compulsory use of a handmade tube of two or three calenders, and it is not unreasonable to believe that in the tubular form of hose construction that the different intermediate courses of rubber would be more satisfactory when made of two or three calenders of sheet rubber.

In connection with the weight of canvas to be used in manufacturing hose, it may be said that various weights have been tried by different makers, but the most satisfactory results seem thus far to be obtained from canvas not lighter than twenty-two ounce, and made in sheets not less than thirty-eight or forty inches wide. In order to provide the necessary elasticity in the canvas to meet the torsional, tensile and radial strains, it is necessary to have the canvas wrappings cut and applied on the bias.

The quality of rubber used in hose is one of the most important features; as to what this should be is a matter that has only been determined by long experience and many experiments. It is safe to say that the use of rubber substitutes and reclaimed rubber is improper, and proper requirements in connection with the tests that the rubber must withstand can be safely relied upon to keep out the use of this or any other cheap and unreliable material. Many years of careful observation have shown that in the longest-lived air hose, the rubber is of such a quality and is so cured as to permit its being stretched four hundred per cent without breaking; this, in addition to the requirement that after being stretched as above for ten minutes, it must within ten minutes after release return to within one quarter of an inch of its original condition, where the measurements are taken between two points which were originally two inches apart, will insure a good quality of rubber compound and proper curing. The rubber in both tube, cover and friction should be of a quality to stand the above test.

Numerous references have been made to the tubular form of hose construction. This style of hose is in its infancy. From all indications given from various shop tests and from theorizing based on such tests, it would appear that the longevity of this hose would be considerably in excess of the style of four-ply wrapped hose now so generally used.

This hose has been in use to a limited extent for over a year, and the indications are still favorable. Time alone will demonstrate the superiority of its claims, but the natural conclusions from the shop tests and the limited service tests so far, would warrant its being considered equally as safe and durable as the older forms of construction, provided it is made of as good material, and is subject to the same tests as other hose. There seem to be no obstacles in the way of all manufacturers making this type of hose if desired.

In concluding this paper, it will be desirable to summarize the deductions from the discussion of the various points, by outlining a short draft of a specification which will at least insure by its use the obtaining of reliable hose, well made, and of a higher grade than the average now manufactured, and which will undoubtedly give longer service than a large percentage of the hose used in the past.

RECOMMENDED SPECIFICATIONS FOR AIR-BRAKE AND SIGNAL HOSE.

1. All air-brake and signal hose must be soft and pliable, not less than two-ply nor more than four-ply.
2. The tube must be handmade, composed of not less than two calenders of thin rubber; it must be free from holes, or imperfections in joining, and must be so firmly united to the cotton fabric that it cannot be separated readily without breaking or splitting the tube. The tube must be of rubber, of such composition and so cured as to successfully meet the requirements of the stretching test given below. The tube must not be less than $\frac{3}{32}$ inch thick at any point. It may preferably be made in composite form, with a complete inner tube of $\frac{1}{16}$ -inch rubber wrapped with a single wrapping of 8-ounce cotton canvas, the whole being covered with an outer tube of $\frac{1}{32}$ -inch thick rubber.
3. The canvas or woven fabric used as wrapping for the hose to be made of good quality cotton, loosely woven, and to weigh not less than 22 ounces per yard, and to be from 38 to 40 inches wide, except when woven with a seamless tubing. The wrapping must be frictioned on both sides, and must have in addition a distinct skimming coat or layer of gum between each ply wrapping not less than $\frac{1}{32}$ inch thick. The friction and coating must be of the same quality of gum as the tube. The canvas wrapping to be cut and applied on the bias.
4. The cover must be of the same quality of gum as the tube, and must not be less than $\frac{1}{16}$ -inch thick. The cover may preferably be made in composite form in the same manner as provided for with the tube. In this case there must be not less than $\frac{1}{32}$ inch thickness of rubber between the outer ply of wrapping and the 8-ounce duck forming part of the cover, and there must be an equal thickness of rubber on the outside.
5. Air-brake and signal hose are to be furnished in 22-inch lengths. Variations exceeding $\frac{1}{4}$ inch above or below this length will not be accepted. The inside diameter of all such hose to be not less than $1\frac{1}{4}$ inches, nor more than $1\frac{5}{8}$ inches, except on the ends, which are to be enlarged to $1\frac{7}{8}$ inches for a distance of $2\frac{3}{4}$ inches, the change from larger to smaller diameter to be made tapering, so that inside of hose will be practically smooth. The outside diameter must not exceed 2 inches, nor be less than $1\frac{7}{8}$ inches in the main part, or exceed $2\frac{3}{8}$ inches, or be less than

$2\frac{1}{8}$ inches at the enlarged ends. Hose must be finished smooth and be regular in size throughout, as above indicated; ends of hose to be capped with from $\frac{1}{8}$ to $\frac{1}{2}$ inch of rubber. Caps must be vulcanized on, not pasted or cemented.

6. Each standard length of hose must be branded with the name of the manufacturer, year and month when made, and the standard railroad mark, and also have a table of raised letters at least $\frac{1}{8}$ inch high, to show date of application and removal, thus:

98	A	1	2	3	4	5	6
99		7	8	9	10	11	12
00	....	.....	.....	.....	.....	.....	.....
01	R	1	2	3	4	5	6
02		7	8	9	10	11	12

All markings except the road mark may be combined in one plate.

All markings to be full and distinct, and made of a thin layer of white or red rubber vulcanized on, and so applied as to be removable only by cutting with a knife or sharp instrument.

7. Air-brake and signal hose will be subjected to the following tests:

Each hose must stand a proof pressure test of 300 pounds without failure of any kind. With every lot of two hundred or less shipped to one point, the manufacturer must furnish free of charge one additional hose for test. From each such lot one hose will be taken at random, and subjected to the following tests in the order named:

BURSTING TEST.

The test hose must stand a hydraulic pressure of 500 pounds before bursting, and must not expand more than $\frac{1}{8}$ inch in diameter under a pressure of 100 pounds.

FRICTION TEST.

A section one inch long will be taken from any part of the hose, and the friction determined by the force and time required to unwind the hose, the force being applied radially. With a weight of 25 pounds suspended from the separated end, the separation must be uniform and regular, and when unwinding the average speed must not exceed 6 inches in 10 minutes.

STRETCHING TEST.

A 1-inch section of the rubber tube or inner lining will be cut at the lap or thickest part. Marks 2 inches apart will be placed on it. The 1-inch strip will next be stretched until the marks are 10 inches apart, and then released immediately. The piece will then be remarked as at first, and stretched to 10 inches, or 400 per cent, and will remain stretched 10 minutes. It will then be released, and the distance between the marks measured 10 minutes after the release. In no case must the test piece break from defective quality of rubber, or show a permanent set of more than $\frac{1}{4}$ inch between the 2-inch marks.

Small strips taken from the cover and friction will be subject to the same test.

8. If test hose fails to stand the required tests, the lot from which they are taken will be rejected without further examination. If test hose are satisfactory, the entire lot will be examined and those complying with the requirements herein set forth will be accepted.

It would seem reasonable that the developments in the manufacture and use of air hose in the next two years will warrant a further consideration of the subject at that time, and it is not unlikely that the superiority of either the tubular or wrapped form of hose will be so clearly demonstrated as to warrant a much more restricted specification; but if hose in the meantime are brought up to the standard just outlined, a marked upward step will have been taken in this important detail of car construction.

Respectfully submitted,

A. M. WAITT.

CLEVELAND, OHIO, June 1, 1898.

MR. MITCHELL: Mr. President, I move that the report be received, and in view of the fact that the two-ply hose has not received service tests enough, and in view of the fact that many of us are experimenting on the same lines as Mr. Waitt, I move that the committee be continued, to report another year. (Seconded.)

MR. LEEDS: I am heartily in accord with continuing the committee, but I would like to see its field extended to some extent, from the fact of the wide introduction of steam heating and the necessity of proper couplings, and I would like to see it extended not only to the steam hose but to the investigation of metallic couplings versus rubber hose.

MR. MITCHELL: I accept that.

MR. LEEDS: I offer that as an amendment.

MR. MITCHELL: I will accept that amendment.

THE PRESIDENT: Gentlemen, you hear the motion. Are you ready for the question?

MR. WAITT: Mr. Chairman, I would say that perhaps it may seem advisable to continue the committee, but it will have to be, for another year, another committee, for I shall positively decline to be chairman, at least, of any committee if I continue on the Committee on Standards. I have done a good deal of work last year, and I have got to the point where I am unwilling to do it next year.

MR. GEORGE GIBBS: I do not want to take the time of the Association, but I cannot forbear saying a word to impress the Association with the very fine piece of work done in this report. Anybody who has taken an interest in rubber hose of any sort, and attempted to obtain any information from the manufacturers or their representatives,

will realize the enormous difficulty of getting any information on the subject, and Mr. Waitt must have employed infinite pains to collect the valuable and correct data he has got into this report.

MR. LEEDS: It would be with a great deal of regret that we would see Mr. Waitt drop this subject as chairman of the committee, from the fact of the valuable information that he has already gained — not only information, but sources of information. I would rather see him dropped off the Committee on Standards than see him dropped out of this committee.

MR. WAITT: Mr. Chairman, allow me to say one word more. At the present time I do not think that another year will warrant making anything very extensive in the way of additional recommendations. I suggested in the report that in two years from now I thought it would be wise and practicable to take the matter up in connection with the subject of the steam hose. I really do not feel personally equal to attempting that subject at the present time. Possibly few of you can realize the amount of time and the amount of hard work it has required to get up this subject, and the labor of taking the subject up and continuing on the same line of thought another year personally seems objectionable to me, and I have made up my mind that I would be unwilling to do that, although in another year, if I am alive and well, if it was wanted, I would be perfectly willing to take it up again.

THE PRESIDENT: In view of Mr. Waitt's suggestions, and as there are so many subjects now to be reported on next year, would it not be advisable to postpone it another year?

MR. MITCHELL: I presume the railroads will know more about the subject in another year, with the information they have in this report. I am not prepared to indorse this specification. I do not think any of us are. We are all studying the question, and have been for probably two years, so I am perfectly willing to postpone it until next year and then have a committee appointed on the subject. I withdraw the motion on that basis.

MR. JOHNSON: I move you, then, Mr. Chairman, that the report of the committee be received and the committee discharged, with the understanding that the recommendation be acted upon within two years.

The motion was seconded by Mr. Mitchell, and carried.

THE PRESIDENT: Is there any further discussion on this report?

If not, we will proceed to the next, which is No. 5 — Springs for Freight Car Trucks. Mr. Lentz is chairman.

Mr. Lentz presented the following report:

REPORT OF COMMITTEE ON SPRINGS FOR FREIGHT CAR TRUCKS.

To the President and Members of the Master Car Builders' Association :

Your committee, to whom the work of recommending designs for standard freight car truck springs was assigned, after having given the subject a careful study, and profiting by previous work done by committees in the different railway clubs, practical experience, suggestions of spring manufacturers and railroad officials who have studied this question, reports as follows:

The chief aim of the committee has been to submit such designs as are practical and economical, in order that, in case of adoption, they may not become a dead letter, but serve the purpose for which they were designed. Standard springs, to be desirable, must be so designed as to best satisfy the following conditions:

1. The springs must be generally applicable to the majority of the existing cars without expensive alterations in their application.
2. They must be so designed that they will not increase the cost of maintenance by premature failure or excessive first cost.
3. There should be a minimum number of different coils, and the different coils should be so made as to be readily distinguished one from the other, so as to prevent confusion and mistakes in application, and to reduce the cost of stock necessary to be carried for prompt repairs to both foreign and individual cars of usual design.
4. All coils used for outside bars to be wound right-handed, and the inner coils to be wound left handed, to prevent interlocking.

In the designing of these springs, it has not been considered necessary to consider cars of less capacity than 40,000 pounds, nor does there seem to be occasion to consider a spring for pedestal trucks for cars of less than 50,000 pounds capacity, as such cars are few in number, and are not likely to be perpetuated. The fact that there is no M. C. B. standard journal box for 90,000 or 100,000 pounds capacity cars, debars the consideration of springs for cars over 80,000 pounds capacity for the present. These can be considered in time to come, when more of these cars are in existence, and some standard journal box is adopted. It was considered desirable that the springs and plates for use with the cars at 40,000 pounds capacity should be available for use under 50,000 and 60,000 pound capacity cars, so that there will be no loss at such time as the 40,000-pound cars cease to exist.

Graduated springs, or springs made of other than round bars, have not been considered, and as the elastic limit per square inch is greater for smaller bars than the larger, it is objectionable to use larger sections than are absolutely necessary. Also as spring coils, and not the spring plates, are the expensive articles and those that break, it is not desirable to sacrifice the designs of the springs for the sake of limiting the cost and number of patterns for spring plates, and it is considered preferable to buy the springs by the coil, and the plates separately, not to be put up in sets. Since it has been found upon investigation that the pressed-steel plates are slightly cheaper

than malleable iron, plates of designs suitable for pressed steel only have been submitted. Moreover, the use of both pressed-steel and malleable iron plates means two separate sets of springs, as, owing to the difference in thickness of the pressed steel and malleable iron (about $\frac{1}{4}$ inch for a pair of plates), the springs used with the steel plates would have to be $\frac{1}{4}$ inch higher than those used with the malleable iron, to give the same free heights over spring plates. It has further been decided that the use of bolts for securing the top and bottom plates are not only superfluous, but a source of danger, in that these bolts get in between the coils and springs, and cause the destruction of the springs, and also are a source of expense in the first cost of the spring plates, as the provision for such bolts adds to the cost.

In the designing of the springs themselves, the best practice has been followed in all cases, and spring makers consulted.

Your committee therefore recommends for adoption as standards the following coils, drawings of which are submitted. The combinations in which these coils can be used appear in the schedule.

Spring A.—5 inches diameter, $\frac{5}{8}$ inch diameter steel, 5 $\frac{7}{8}$ inches free height; to carry 3,500 pounds at 5 inches; weight, 10 $\frac{3}{4}$ pounds.

Spring B.—3 $\frac{1}{8}$ inches diameter, $\frac{1}{2}$ inch diameter steel, 5 $\frac{7}{8}$ inches free height; to carry 1,150 pounds at 5 inches; weight, 4 pounds.

Spring C.—7 inches diameter, 1 $\frac{1}{8}$ inch diameter steel, 7 inches free height; to carry 8,000 pounds at 6 inches; weight, 24 $\frac{1}{2}$ pounds.

Spring D.—4 $\frac{1}{4}$ inches diameter, $\frac{7}{8}$ inch diameter steel, 7 inches free height; to carry 4,500 pounds at 6 inches; weight, 9 $\frac{1}{2}$ pounds.

Spring E.—7 $\frac{1}{2}$ inches diameter, 1 $\frac{3}{8}$ inch diameter steel, 7 $\frac{1}{2}$ inches free height; to carry 11,000 pounds at 6 $\frac{1}{2}$ inches; weight, 32 pounds.

Spring F.—4 $\frac{1}{2}$ inches diameter, $\frac{3}{4}$ inch diameter steel, 7 $\frac{1}{2}$ inches free height; to carry 5,000 pounds at 6 $\frac{1}{2}$ inches; weight, 12 $\frac{1}{2}$ pounds.

By reference to the column headed "Arch Bar Trucks," in the schedule submitted, it will be seen that the carrying capacities of the groups recommended increase by fairly regular graduations. To enable the recommended coils to be most generally and economically useful, such groups can be selected and used as come nearest in capacity to the actual load to be carried, without reference to the marked carrying capacity of the car. Thus a heavy refrigerator car of 50,000 pounds capacity and a flat car of 70,000 pounds capacity may use the same combination of springs, on account of the great difference in light weight of the bodies.

If this plan is followed, the committee would recommend that the number and class letter of the coils to be used in each truck should be stenciled on the truck to prevent mistakes being made by repairmen.

To meet the greatest possible variety of conditions, drawings for spring caps are submitted, showing caps for springs C and D or E and F, to be used in groups of four, or in groups of two, the smaller coils being placed inside the larger ones. Your committee recommends that the springs and caps submitted, and the schedule for their use, be referred to letter ballot as recommended practice.

JOHN S. LENTZ,
A. G. STEINBRENNER,
R. P. C. SANDERSON,
F. W. BRAZIER,

Committee.

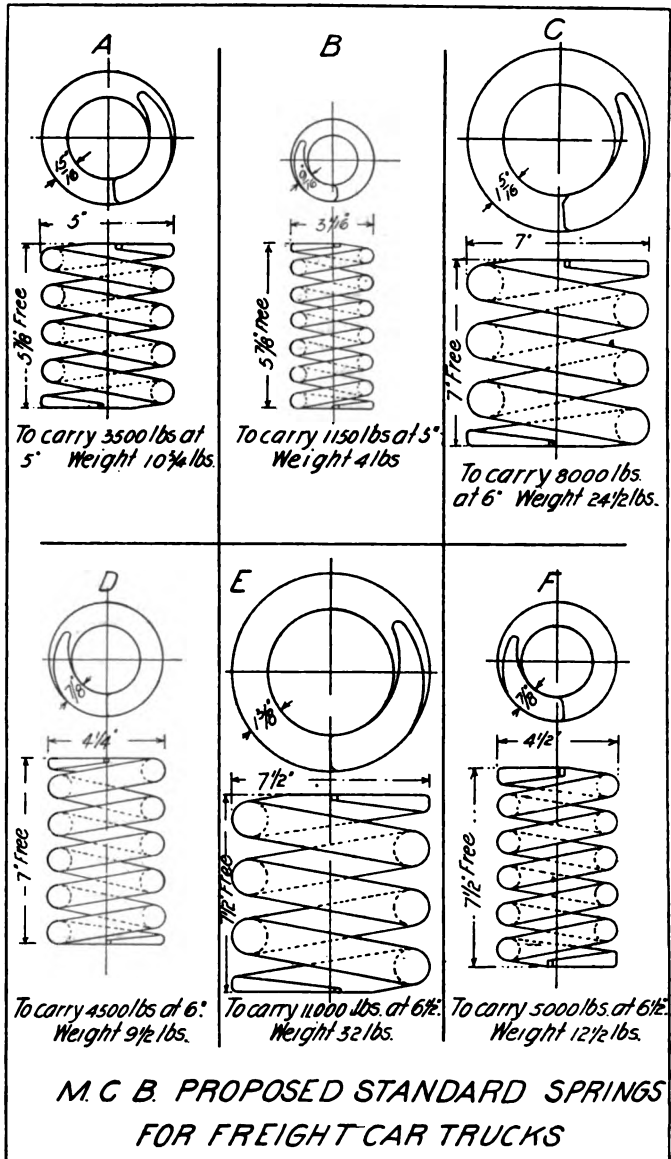
SOUTH BETHLEHEM, PA., May 24, 1898.

SCHEDULE
FOR THE USE OF RECOMMENDED SPRINGS.

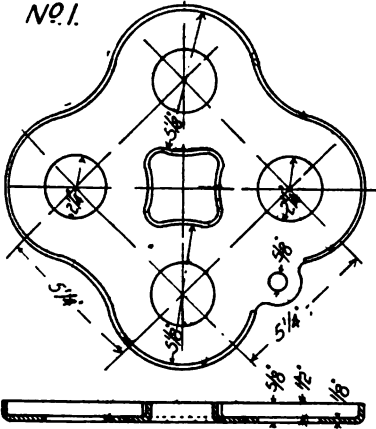
Capacity of Car.	Arch-Bar Trucks — Per Group.					Pedestal Trucks — Per Box.			
	No. of Coils.	Capacity, Lbs.	At. Inches	Weight, Lbs.	Cap.	No. of Coils.	Capacity, Lbs.	At. Inches	Weight, Lbs.
40,000 Lbs.	4 of A	14,000	5¼	43	No. 1	.....	.....	....	....
50,000 Lbs.	4 of A 2 of B	16,300	5¼	51	No. 1	1 of C	8,000	6	24½
	5 of A	17,500	5¼	53¾	No. 2	.....	.....	....	....
60,000 Lbs.	4 of A 4 of B	18,600	5¼	59	No. 1	1 of C 1 of D	12,500	6	34
	6 of A	21,000	5¼	64½	No. 3	.....	.....	....	....
70,000 Lbs.	2 of C 2 of D	25,000	6¼	68	No. 4 or No. 5	1 of E 1 of F	16,000	6½	44½
80,000 Lbs.	2 of E 2 of F	32,000	6¾	89	No. 6 or No. 7	1 of E 1 of F	17,000	6¼	44½

NOTE.—Heights given in above include spring caps for arch-bar trucks.

Number and class letter of springs used to be stenciled on the trucks of cars.



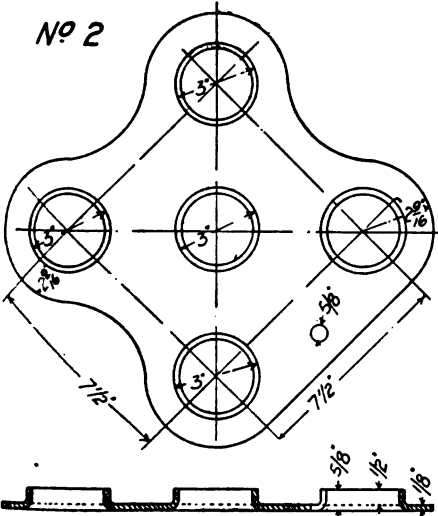
No. 1.



M. C. B.
PROPOSED STANDARD
SPRING CAPS
FOR
FREIGHT CAR TRUCKS.

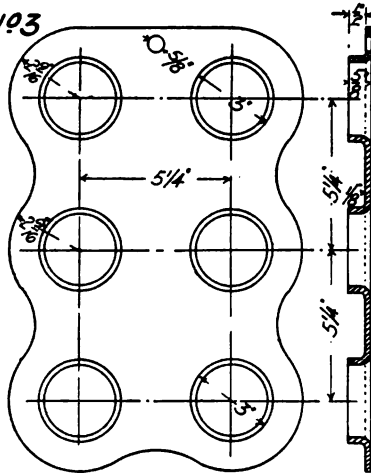
Used on arch bar trucks for Cars of 40,000, 50,000 or 60,000 lbs. capacity; with groups of four coils. With or without inner coils as required by capacity of car and as indicative in schedule.

No. 2



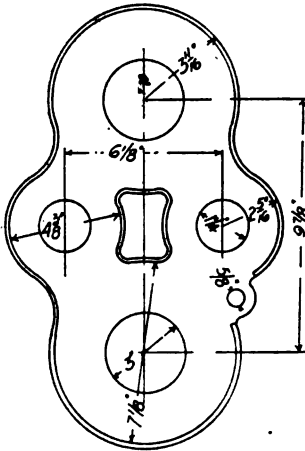
Used on arch bar trucks for cars of 30,000 lbs. capacity with groups of five coils.

No. 3



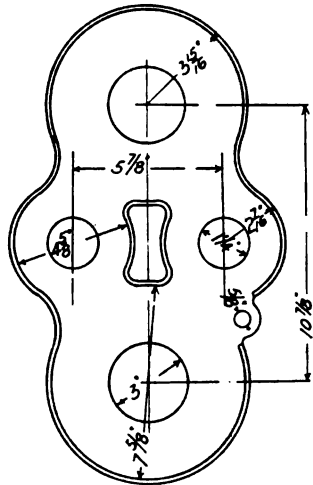
Used on arch bar trucks for Cars of 60,000 lbs. capacity with groups of six coils.

№ 4



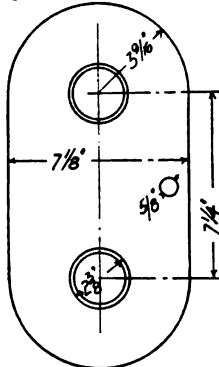
Used on arch bar trucks for cars of 70000 lbs. capacity, with groups of four coils.

№ 6



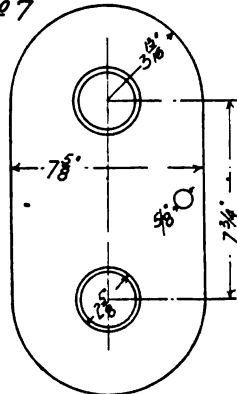
Used on arch bar trucks for cars of 80000 lbs. capacity with groups of four coils.

№ 5



Same as № 4 but with groups of two coils with inner coils.

№ 7



Same as № 6 but with groups of two coils with inner coils

On motion, the report and its recommendations were adopted.

MR. MITCHELL : I would like to ask the committee if this schedule has been submitted to the spring makers to demonstrate whether the weights they give for the capacity of springs and the size for the coil and the wire from which they are made are correct.

MR. LENTZ : Mr. Chairman, I would say that I obtained sets of coils and had them tested at our shops at South Easton, by our mechanical engineer, so that the weights given are correct.

MR. WAITT : Mr. Chairman, in connection with the report there are one or two curious things that I would like to ask the committee to advise us about. Looking on page 4 of the schedule, cars of 60,000 pounds capacity for example, the capacity of the springs in pounds, it will be noticed, in the arch-bar group is 18,600 pounds. Four groups of that kind to a car would be 74,400 pounds. You will notice for the same capacity car—the pedestal trucks—each spring has a capacity of 12,500 pounds. Eight of those to a car would be 100,000 pounds. In other words, they give a capacity of spring according to the schedule here of 25,000 pounds per car more for pedestal trucks than for arch-bar trucks. I notice also that the same thing holds good in 70,000-pound cars. The capacity of the spring for the pedestal type of truck amounts to 128,000 pounds, and for the arch-bar truck only 100,000 pounds. In the 80,000-pound car, however, they have got it down nearer to 136,000 for the pedestal and 128,000 for the arch-bar type. It would seem, if we are going to adopt this for recommended practice, as though it would not be exactly consistent to recommend such a vast difference in the capacity of the springs for the two types of trucks.

MR. JOHNSON : I noticed the same discrepancy, but I attributed it to the fact that with the pedestal type of truck the shock was made directly by one wheel, while in the bolster style of truck it is absorbed more or less through the whole frame before it reaches the spring. Consequently I do not think the committee intended the same strength of spring applicable to the bolster as was necessary where the shock was made direct.

THE PRESIDENT : Is there any further discussion? If there is no further discussion, we will pass to the next subject : Thermal Tests for Car Wheels. Mr. Bush is chairman of the committee.

Mr. Bush read the following report :

REPORT OF COMMITTEE ON THERMAL TESTS FOR CAR WHEELS.

To the President and Members of the Master Car Builders' Association :

GENTLEMEN,—There are in service in the United States and Canada at the present time, approximately, 9,750,000 cast-iron car wheels, costing in round numbers \$58,500,000. There are produced and put into service in this territory each year, approximately, 1,100,000 car wheels, at an estimated value of \$6,600,000. These wheels are engaged in conducting the entire rail transportation business of the United States and Canada, and I think it can be truly stated that the cast-iron car wheel is one of the greatest iron products of the United States, and one that is well worth preserving. The long-continued use of the cast-iron wheel in this country particularly testifies to its great efficiency and economy, and to preserve this useful product, as to preserve any product of industry, requires its continual improvement. That the quality of the cast-iron wheel has been improved materially from time to time there is no doubt, but that it is in need of still greater improvement, it is thought, there is also no doubt.

At the last Convention of this Association, one of the members presented some facts concerning the breakage of cast-iron wheels, and these facts being taken from authenticated records, it will not be out of the way to again quote them. There were removed during a period of four years and four months on the division of the Pennsylvania Railroad from Pittsburgh to Philadelphia a grand total of 7,180 wheels, on account of being either cracked or broken, 6,446 being cracked and 250 being broken. The wheels removed comprised those produced by almost every manufacturer in the United States, and it can be safely stated that practically all cast-iron wheels are subject to cracking or breaking when subjected to service with which they are likely to meet on many of the railroads of the country. A careful examination of these wheels indicated that they were cracked or broken principally by the expansion of the rim, or because of internal strains, coming as a result of imperfect manufacture, so great as to produce rupture when in service.

That these facts hold good to the same, or less, extent on other roads there is no reason to doubt, and certainly with such facts before us it is not out of the way to conclude that such failures should be eliminated, if it is possible to do so. The direct loss of the wheels failing in service is small as compared with the damage consequential therefrom. I doubt if there will be much dissent from this view of the case, and believe that it is unnecessary to dwell further on the necessity of avoiding this difficulty.

During the past three years it has been fully demonstrated that cast-iron wheels can be produced which will resist satisfactorily the destructive force of sudden expansion of the rim, and which will not possess, to any material extent, internal strains. This has been demonstrated by actual service, and also by means of a test designed to reproduce, in a measure, the conditions of service, now commonly known as the thermal test. The manner of performing this test is generally known by everyone at this time, and was recommended by a committee of this Association at the last Convention to be incorporated as part of the wheel specifications of the Master Car Builders' Association.

When first introduced, this test was thought to be unnecessarily severe, and did not represent the conditions of service. The fact, however, that most manufacturers

at the present time have no difficulty in producing wheels to comply with this part of the specifications, with but a small increase in cost, would rather indicate that it is quite practicable, even though it does not reproduce exactly the conditions of service. It might be stated on this particular point that the fundamental principle of all specifications relating to material has for its basis the proving of ability not to stand the usual conditions alone, but extraordinary conditions, and this too with a good margin to spare, commonly known as the factor of safety. Therefore, if the thermal test is severe, it is properly so, but as stated above it can hardly be considered unreasonably so. It may be that the thermal test has certain disadvantages, and of this something will be said later, but the subject of this paper has to do more with the principle of the thermal test than with the detail.

Having thus far spoken of the advantages of producing and using wheels that will stand the thermal test, or conditions of service similar, the question naturally arises whether any necessary qualities of the car wheel are thereby impaired. It is evident that it would not be desirable to obtain that quality in a wheel which would prevent cracking, or fracture, at a somewhat increased cost, but which at the same time would reduce the average life materially. The opinion has been expressed by a few that if wheels are produced so as to withstand the thermal test, the wearing quality, or mileage life, will be very materially reduced. This assertion is based on the belief that that quality in a car wheel which produces strength is in a very large measure opposed to those qualities which produce durability of the tread and flange. The writer has made an effort to obtain some figures to bear out this side of the case, but has been unable to do so. Wheels manufactured to withstand the thermal test have not been in service a sufficient length of time to demonstrate it generally, but it is thought that in another year some well-authenticated facts can be given.

Those making the above assertion endeavor to demonstrate the correctness of their position by presenting figures showing the mileage life of wheels on some roads known to have one of the qualities spoken of above, and those on other roads having the other quality spoken of to a greater extent than the former. To put this difference in quality more specifically, it might be stated that the wheel which is said to produce a greater durability of tread and flange contains a greater proportion of combined carbon, while the wheel that is best adapted to withstand the thermal test has a larger percentage of graphitic carbon.

It is necessary here to explain the method of arriving at such figures, which is as follows: If we have, for example, 10,000 wheels in service, and experience for a period of ten years shows that in order to keep the equipment in good condition it is necessary to renew 1,000 wheels a year, it is obvious that the life of each wheel in service will be ten years; or, in other words, if the number of wheels drawn and renewed each year is sufficient to keep the equipment in good condition, the life of the wheels is obtained by dividing the total number in service by the number drawn per year.

Without considering the various influences that may come into such a calculation in ordinary practice, this may seem an entirely correct method, but it only applies when the equipment remains the same from year to year. If additions are made to the equipment a disturbing influence is immediately introduced. Also, it is assumed that the total number of wheels put under an owner's cars by foreign roads is the same as are put under foreign cars by the owning road, and finally that the mileage made by

owner's cars on foreign roads is equal to the mileage made by foreign cars on the owner's road. These assumptions may or may not be true, and whatever results are obtained the figures thus deduced can at best only be approximate.

The method indicated above is quite commonly used. As showing the inaccuracies of this method, however, it is only necessary to point to the following example:

According to this method, the life of wheels drawn during the year 1890 on one road was 7.4 years, while the life of wheels drawn on the same road in 1892 was 12.4. This difference in the life is due to the fact that for two years prior to 1890 large additions had been made to the equipment without a corresponding drawing of wheels; consequently the total number of wheels in service increased very greatly, while the renewals did not increase proportionately until 1892 and after. Again, in 1892 on the same road a very large addition to the equipment took place, with considerable diminution in the number of wheels drawn. This produced a very long life for such wheels as were drawn.

It must be evident, without argument, that there is no such violent fluctuation in the life of wheels under cars. If necessary allowances are made for the variations in the equipment, etc., above indicated, a very different result is obtained. For example:

If the average of the total number of wheels in service for five consecutive years be taken, and this sum divided by five, and the yearly average of the wheels drawn for the same five consecutive years be taken, then we obtain the average life in years for the wheels drawn, which applies with considerably greater accuracy to the last one of the five years in question. Again, if we drop the figures for the first year of the group and take the figures for the succeeding year, we obtain another average life of years corresponding to the wheels withdrawn during the last year, and so on.

If objection is raised to a period of five years, it may be stated that by increasing the period, the greater will be the accuracy. The table given below shows the average life of wheels obtained on a road by each of the plans outlined above.

AVERAGE LIFE OF WHEELS IN YEARS.			AVERAGE WHEEL MILEAGE.		
Year.	Five-year Plan.	Ordinary Plan.	Year.	Five-year Plan.	Ordinary Plan.
1887.....	9	8.7	1887....	114,936	105,824
1888.....	8.5	8	1888....	108,280	99,080
1889.....	8.5	9.7	1889....	106,256	115,232
1890.....	8.4	7.4	1890....	104,056	94,456
1891.....	8.5	9.2	1891....	105,504	108,640
1892.....	9.2	12.4	1892....	111,024	137,776
1893.....	9.6	10.3	1893....	113,364	109,984
1894.....	9.6	9.5	1894....	107,496	95,144
1895.....	9.4	7.2	1895....	102,829	80,008
1896.....	9.3	8.8	1896....	99,446	89,083

It will be observed that the violent fluctuations produced by the first method almost disappear by using the second method, and the life of wheels expressed in years is much the same from year to year, which is really what might be expected, there being no real reason why the average life of wheels should change very greatly.

Considerable attention has been given to this method of calculating the life of wheels, as the whole question is of so much importance that it is thought desirable not to let this important point pass by unobserved. If the latter method of computing the mileage life is used, the writer has been unable to find that wheels commonly known as "hard" wheels, having a greater proportion of combined carbon, show any longer life than those known as "tough" wheels, having less combined carbon but more graphitic carbon. The question very naturally arises here as to why, if at all, a wheel having the former qualities should give a longer life than one having the latter qualities. It is a well-known fact that it is the chill given to the tread and flange of a wheel that enables it to be used, and that gives it its wearing qualities, and it is not unreasonable to suppose from our present knowledge of wheel manufacture that if the character of the chill of one wheel is known by its chemical make-up to be exactly the same as that of another, the wearing qualities would also be the same. Of course the total mileage life of a wheel depends directly on the depth of the chill, as well as upon the quality; but if two wheels, both having the same quality of chill as well as the same depth, the one being made of iron of high combined carbon, known as hard iron, and the other being made of iron with low combined carbon, or the tough variety, it would certainly be expected that both wheels would give the same mileage life so far as the chill is concerned, but that the latter would withstand the heating of the rim, or the thermal test, better than the former.

Through the General Superintendent Motive Power of the Pennsylvania Railroad, Mr. F. D. Casanave, and the Chemist of that road, Dr. C. B. Dudley, I am able to present the following facts bearing on this point:

Twenty wheels were selected from those in service, representing some of the principal makes of the country, all of which were subjected to the thermal test, 10 passing it successfully and 10 failing. Chemical analyses were made of the iron of which these 20 wheels were made, two sets of samples being taken, one from the body, or gray iron, and the other from the chill. The result of these analyses is as follows:

ANALYSES OF THE GRAY IRON.

STOOD THERMAL TEST.

Total Carbon.	Graphitic Carbon.	Combined Carbon.	Manganese.	Phosphorus.	Silicon.	Sulphur.
3.68	3.00	0.68	0.64	0.30	0.56	0.11
3.54	2.74	0.80	0.28	0.47	0.65	0.10
3.50	3.48	0.02	0.35	0.40	0.45	0.13
3.65	2.41	1.24	0.31	0.53	0.57	0.16
3.73	2.89	0.84	0.83	0.38	0.50	0.11
3.63	3.03	0.60	0.44	0.43	0.56	0.12
3.67	2.70	0.97	0.24	0.38	0.53	0.10
3.67	3.03	0.64	0.32	0.42	0.47	0.16
3.64	2.53	1.11	0.33	0.50	0.62	0.12
3.86	3.31	0.55	0.30	0.36	0.63	0.11

DID NOT STAND THERMAL TEST.

Total Carbon.	Graphitic Carbon.	Combined Carbon.	Manganese.	Phosphorus.	Silicon.	Sulphur.
3.64	2.41	1.23	0.30	0.35	0.71	0.14
3.22	1.98	1.24	0.34	0.51	0.77	0.16
3.51	2.56	0.95	0.31	0.44	0.75	0.12
3.64	2.30	1.34	0.21	0.39	0.65	0.13
3.61	2.52	1.09	0.17	0.35	0.60	0.11
3.61	2.94	0.67	0.33	0.42	0.79	0.12
3.73	2.60	1.13	0.23	0.35	0.66	0.11
3.68	2.54	1.14	0.19	0.39	0.88	0.12
3.74	2.57	1.17	0.30	0.41	0.60	0.13
3.45	2.39	1.06	0.40	0.36	0.68	0.19

ANALYSES OF THE CHILLED IRON.

STOOD THERMAL TEST.			DID NOT STAND THERMAL TEST.		
Total Carbon.	Graphitic Carbon.	Combined Carbon.	Total Carbon.	Graphitic Carbon.	Combined Carbon.
3.90	0.43	3.47	3.90	0.34	3.56
3.71	0.32	3.39	3.37	0.32	3.05
3.73	0.42	3.31	3.71	0.43	3.28
3.70	0.55	3.15	3.75	0.78	2.97
3.87	0.41	3.46	3.74	0.49	3.25
3.77	0.55	3.22	3.77	0.30	3.47
3.84	0.35	3.49	3.86	0.48	3.38
3.84	0.40	3.44	3.80	0.41	3.39
3.71	0.49	3.22	3.82	0.29	3.53
4.01	0.30	3.71	3.56	0.36	3.20

These figures cover determinations actually made. It was not deemed essential to determine the phosphorus, silicon and manganese in the chills, as there was no reason to think that they would differ in proportion from the same elements in the gray iron. In reality all borings for the two analyses were obtained not over 3 or 4 inches apart in the same wheel, the one being from the gray iron in the plate and the other from the chill. It is well known that the difference between chilled iron and gray iron in the same casting is in the condition of the carbon. It will be noted that in the gray iron the graphite is pretty well toward 3 per cent, and that the combined carbon is toward 1 per cent, while in the chill the figures are reversed, the variations being not far from one-half of 1 per cent. The figures giving the analyses of the gray iron are given for a comparison and as a matter of information.

The main point in these analyses, to which special attention is called, is the close agreement in the composition of the chills of these different wheels. If we take the averages of those that did and those that did not stand the thermal test, we find as follows :

	Total Carbon.	Graphitic Carbon.	Combined Carbon.
Average of wheels which stood the thermal test	3.81	0.42	3.39
Average of wheels which did not stand thermal test	3.73	0.42	3.31

It will be noted that the graphitic carbon is the same in both cases, and that the combined carbon only differs .08 per cent. Furthermore, the general agreement of the combined carbon of the chills in wheels from different makers is very noticeable and very remarkable. It is difficult to see how any other conclusion can be drawn from these figures than that there is no evidence, so far as the chemical composition is concerned, to show that the chills of wheels which stand the thermal test differ in their physical properties, so far at least as the physical properties depend on the chemistry of the metal, from the chills of wheels which do not stand the thermal test. Also, it seems fair to conclude that wheels made in different parts of the country and by different manufacturers do not differ very widely so far as chemical composition of the chills is concerned. It is quite obvious why this should be so, since the chill fixes the chemical composition within very narrow limits. Therefore, to emphasize what has been stated previously, it seems reasonable to conclude that the wear of wheels depends on the chill, and if chills of various wheels are as closely alike as these analyses show them to be, there is really no evidence that the wear of these chills will differ to any appreciable extent.

It was stated in the early part of this report that in the course of another year, facts from the actual wear of wheels in service can be deduced to show whether or not the above conclusion is correct, but in the absence of any facts of this kind, it does not seem proper to assert that wheels manufactured to stand the thermal test will not give as great a mileage wear as those that will not.

Referring now to the manner of conducting the thermal test. The method now used may be criticised to some extent, and justly too, on the ground that it cannot be applied with absolute uniformity at all times and at all places—that is to say, in pouring the ring of molten metal around the rim of a wheel, it is difficult, if not almost impossible, to have the iron always at exactly the same temperature, so that in some cases the test will be a little more severe, and in others a little less. The test recommended by the committee of the Association last year requires that this ring of metal be poured at a temperature as low as possible without producing seams or wrinkles. It is, of course, difficult to say exactly when the iron is at such a temperature, but it is believed that the foreman in charge of most wheel foundries is so experienced as to be able to tell very closely from the appearance when the iron has arrived at this temperature before pouring.

The writer has communicated, concerning the thermal test, with nearly all of the principal wheel manufacturers of the country, and they have been asked to suggest a method that will be more accurate. They have all given the matter considerable attention, and up to the present time have been unable to develop any plan that would be any more satisfactory and still thoroughly practicable.

The everyday use of the present thermal test has demonstrated its extreme simplicity, and with the one exception of possible variation in the temperature of the

molten metal, it seems admirably adapted to the main purpose. As previously stated, the object of such a test is to produce conditions more severe than those of service, so that it may be known what margin of safety can fairly be counted on beyond. As to the magnitude of variation in the temperature of molten metal used for the test, it is believed that undue significance has been attached to this, and that there is a growing feeling that it is so inconsiderable as to give practical uniformity.

The great majority of the wheel makers of the country state that there is no difficulty in producing wheels which will stand the present test, and that the test itself is satisfactory. This being the case, and in view of the facts here given, it would seem that the thermal test ought to commend itself to users of wheels as a satisfactory way to the purchase of that which is desired with all the certainty possible, viz, safety.

In conclusion, it may be again said that there is up to the present time no reason to believe that in obtaining greater safety, durability is sacrificed; on the contrary, all of the evidence thus far obtainable goes to show that decreased durability is not to be expected; in fact, one of the most prominent manufacturers in the country is making wheels for special purpose of obtaining toughness, and states his ability to prove even a higher mileage life.

S. P. BUSH.

COLUMBUS, OHIO, May 28, 1898.

On motion, the report was received.

THE PRESIDENT: The report is now open for discussion. If there is no discussion on this report, we will proceed to the next subject, which is No. 8—Revision of Air Brake and Signal Instructions. Mr. E. W. Grieves is chairman.

MR. GRIEVES: Mr. President, as this was a joint committee composed of members of the Master Car Builders' Association and of the American Railway Master Mechanics' Association, Mr. Rhodes was made chairman, and I will call on him to read the report.

MR. RHODES: Mr. Chairman, the report has been printed and in the hands of the members for some time, and I do not believe it is necessary to read the report. I will just say in explanation that at the last annual convention a number of criticisms were made on the report, and this year the committee has endeavored to reconcile those criticisms, and I believe it is now presented in a shape which will meet with the views of the convention. At any rate, it meets with the views and criticisms made last year, and I should think it would be proper to accept the report and refer it to letter ballot as one of the standards of the Association.

The report is as follows:

JOINT REPORT OF COMMITTEES ON REVISION OF AIR BRAKE AND SIGNAL INSTRUCTIONS.

To the Presidents and Members of the Master Car Builders' Association and American Railway Master Mechanics' Association :

The committees appointed by both Associations to revise the Air Brake and Signal Instructions have jointly agreed to recommend certain changes in these Instructions.

A joint meeting of the two committees was held in Chicago, March 14, 1898, at which were present —

G. W. Rhodes (Chairman), S. M. P., C. B. & Q., Aurora, Ill.

C. H. Cory, S. M. P., C. H. & D., Lima, Ohio.

E. W. Grieves, Galena Oil Company, Baltimore, Md.

William Garstang, S. M. P., C. C. C. & St. L., Indianapolis, Ind.

J. E. Simons, A. M. C. B., P. & L. E., McKee's Rocks, Pa.

J. A. Chubb, Superintendent Air Brakes, M. C. R'y, Detroit, Mich.

W. J. Hartman, Air Brake Instructor, Big Four R'y, Indianapolis, Ind.

A. J. Cota, Air Brake Instructor, C. B. & Q., Aurora, Ill.

In order to condense the report as much as possible, where no mention is made of any rule or section, the committees intend that no change shall take place.

GENERAL INSTRUCTIONS.

At the bottom of page 147, in third paragraph, after the word "information" erase the words "has been" and substitute the words *will be*.

Page 147, in the second line from the bottom, after the word "railroad" insert the following: *whose duties require a knowledge of the operation and maintenance of the air brake and air signal*, will be furnished with a copy, etc.

INSTRUCTIONS TO ENGINEMEN.

Page 148, in first paragraph, second line, erase the word "locomotive" and substitute the word *engine*.

In the last line of the first paragraph, make the line read, "less than *six* inches, nor more than *nine* inches," and add the following to the paragraph: *They must also know that the air signal responds properly by opening the stopcock of the air-signal train line.*

In paragraph, Making Up Trains and Testing Brakes: Cross out the words "70 pounds train-pipe pressure" and insert the words *not less than 90 pounds main reservoir pressure*. Cross out the words "with the handle of the engineer's valve standing in position 2, before connecting to the train," and insert the following after the word "engine": *when connected to the train*.

In the fourth paragraph, third line, change the figures "20" to 25. The sentence will then read, "apply the brakes with full service application of not less than 25 pounds reduction," etc.

In the second line from the bottom, change the word "engine" to *locomotive*.

Page 151, under the heading Double Headers, change the word "engine" to *locomotive* in the first and fourth lines.

Page 152, change the word "engine" to *locomotive* in the first line; also make the same change twice in the fourth line from the top.

In the second paragraph, cross out the words "and coupling" after the word "hose" in the first line and after the word "hose" in the third line, and insert the word *complete* after each. The paragraph will then read as follows:

"An Extra Air-Brake Hose *complete* must always be carried on the *locomotive* for repairs in case of a burst hose. Upon *locomotives* having the air signal, a signal hose *complete* must also be carried for the same purpose."

INSTRUCTIONS TO TRAINMEN.

Page 152, in paragraph, Making Up Trains and Testing Brakes, change the word "engine" to *locomotive* in the first line.

Page 153, in paragraph immediately below Fig. 6, in first line after the word "than," cross out the words "the division time card specifies" and insert *provided for by special instructions*. The sentence will then read: "The air brakes must not be alone relied upon to control any freight train with a smaller proportion of cars with the air brake in service than *provided for by special instructions*."

Paragraph, Detaching Engine or Cars: Omit the last sentence, commencing with the words "If the brakes have been applied," etc. In the heading change the word "engine" to *locomotive*. The paragraph will then read:

"DETACHING *Locomotive* OR CARS.—First close the cocks in the train pipes at the point of separation, and then part the couplings invariably by hand."

Page 154, in paragraph, Brakes Sticking: Cross out the words "in the train" and insert *by special*. The sentence will then read: "If brakes are found sticking, the engineer must be signaled 'brakes sticking,' as provided for *by special rules*."

Fig. 7. Insert *position 1* and *position 2*, which are referred to on page 156 under paragraph, Pressure Retaining Valve.

Page 155, in paragraph, Burst Hose: Add the following to the end of the paragraph: *One extra air-brake hose complete should be carried by all crews, and one extra signal hose complete carried by passenger crews for repairs.*

INSTRUCTIONS TO ENGINE HOUSE FOREMEN.

Page 155, in paragraph, General: In the second line, change the word "engine" to *locomotive*.

In paragraph, General: In fourth line, after the words "air-tight" insert the following: *duplex gauges tested every thirty days*, so the last sentence will read: "It must be ascertained that all pipe joints, connections and all other parts of the apparatus are air-tight, *duplex gauges tested every thirty days*, and that the apparatus is in good working order.

Page 156, in paragraph, Adjustment of Brakes: In the third line from the bottom, after the word "less," cross out the words "than five nor more than," so that the sentence will read: "The tender brake must be adjusted by means of the dead truck levers, so that the piston travels not less than *six* inches when the air brake is applied and the hand brake is released." In the last line change the word "eight"

to *nine*. The sentence will then read: "This adjustment must be made whenever the piston travel is found to exceed *nine* inches."

In paragraph, Brake Cylinders and Triple Valves: In the last line change the word "engine" to *locomotive*.

In paragraph, Draining: Make the last line read: "and the train pipe under the *engine* and tender blown out."

In paragraph, Air Signal: Change the first sentence to read as follows: "The train air signal apparatus must be examined and tested by *suitable appliances from both the head end of the engine* and rear of the tender to *know* that the whistle responds properly."

INSTRUCTIONS TO INSPECTORS.

In paragraph, General: On the second line, immediately preceding the words "conductor's valve," insert the words *triple valve*.

Make the third paragraph, under the heading General, read as follows: *Special rules will specify the smallest proportion of freight cars, with the air brakes in good condition, which may be used in operating the train as an air-brake train.*

Page 157, in paragraph, Making Up Trains and Testing Brakes: In the fourth line, after the words "dummy couplings," insert the words *if so equipped*. In the third line, after the word "closed," insert the words: *The inspector must know that the air is passing through the pipes to the rear end*. In the next sentence insert the word *fully* before the word "charged," so that it will read: "After the train is *fully* charged, the engineer must be signaled to apply the brakes."

Page 157, in paragraph, Cleaning Cylinders and Triple Valves: Substitute the word *bleed* cock for "small" cock.

Insert a new paragraph, as follows:

Graduating Springs.—The graduating springs in the Westinghouse quick-action freight triple valves are No. 15 B. W. G. brass wire, 14 coils, 3 inches free height after taking permanent set; and in passenger No. 14 B. W. G., 12 coils, 2½ inches free height after receiving permanent set.

In paragraph, Adjustment of Brakes: In the fourth line, omit the word "live," and in the fifth line make the figures "1½ inches" read *1 inch*. Make the last sentence read as follows: "When under a full application the brake-piston travel is found to exceed *nine* inches upon *passenger or freight cars*, the brake shoe slack must be taken up and adjustment so made that the piston shall travel not less than six inches. *In taking up the brake shoe slack it must never be taken up by hand brakes.*"

GENERAL QUESTIONS.

Insert a new question, as follows:

44a. Q. *From where does the air signal apparatus receive its pressure?*

A. *From the main air reservoir through the reducing valve.*

In Question 53, change the word "house" to *hose*.

In the answer to Question 57, erase the words "West Virginia" and substitute the words *a good quality of*. Erase the word "must" in the second line, and substitute the word *should*.

In Question 60, change the word "the" to *an*, so that it will read: "Why is *an*-equalizing engineer's valve better than the older forms?"

In question 61, change the word "the" to *an*.

In Question 67, change the word "engine" to *locomotive*.

Make Question 69 read: "When the locomotive is coupled to the train, why is it necessary to have *90 pounds or more* pressure *in* the main reservoir?"

In the answer to Question 74, change the words "six or eight" to *five to seven*. It will then read: "by applying them lightly at first with *five to seven* pounds reduction of air in the train pipe," etc.

In Question 80, change the answer to read: "By placing the handle on the engineer's valve in *full release position No. 1 for a few seconds and returning it to the running position No. 2.*"

In Question 85, change the word "engines" in the first and second lines of the question, to read *locomotives*; also make the same change in the first and second lines of the answer.

Insert a new question and answer as follows:

93a. Q. *Should the train pipe pressure exceed the maximum of 70 pounds, where would you look for the cause of the trouble in the Westinghouse F 6 brake valve?*

A. *Either the supply valve needs cleaning, the rotary disk valve is unseated, or the gasket between the main reservoir connection and chamber D is defective; or the feed valve attachment case gasket is defective; or the regulating spring below the piston needs adjusting.*

In the answer to Question 97, change the word "engine" to *locomotive*.

In the answer to Question 111, the first line, change the word "engine" to *locomotive*.

In the answer to Question 114, change the word "one" to *two*. It will then read: allowing *two* full seconds to elapse between pulls.

Insert five new questions and answers as follows:

121a. Q. *What is the difference between the Westinghouse quick-action passenger and freight triple valve?*

A. *The passenger triple valves have larger ports and slide valves.*

121b. Q. *How may a passenger triple valve be distinguished?*

A. *By having but one exhaust outlet and a raised letter "P" cast on the body.*

121c. Q. *How may a freight triple valve be distinguished?*

A. *By its two exhaust outlets, one being plugged.*

121d. Q. *When should a Westinghouse freight triple valve graduating spring be replaced with a new one?*

A. *When it is found to be less than 3 inches in length.*

121e. Q. *When should a passenger triple valve spring be replaced with a new one?*

A. *When it is found to be less than 2¼ inches in length.*

E. W. GRIEVES,

WM. GARSTANG,

JAMES E. SIMONS,

E. D. BRONNER,

Committee of M. C. B. Ass'n.

GODFREY W. RHODES,

C. H. CORY,

A. M. WAITT,

A. W. BALL,

B. HASKELL,

Committee of A. R. M. M. Ass'n.

THE PRESIDENT : Gentlemen, you have heard the remarks of Mr. Rhodes. What is your pleasure in the matter ?

MR. WAITT : Mr. President, I move that the report be received and the Air Brake and Signal Instructions, as revised, be submitted to letter ballot as recommended practice of the Association.

The motion was carried.

THE PRESIDENT : The report is now open to discussion, if there is any.

The next report is No. 9 — Steel Car Framing. Mr. Mitchell is chairman.

MR. MITCHELL : The Committee on Steel Car Framing found it absolutely impossible to make any definite recommendations as to the framing of steel cars. They found that only twelve per cent of the members knew anything about the subject, and they also found that several of them are building steel cars at the present time, and until they had experience with those steel cars it was impossible to state anything relative thereto. We tried to obtain the definite calculation of the strength of the various designs submitted last year, but only one report submitted sufficient details so that we could calculate exactly the stresses in the various members. This report, therefore, is simply historical, to show what has been done in the past, to guide the members in the future in the design of steel car framing. I hardly think it is necessary to read the report, as it contains only a synopsis of the answers received to our circular letter of inquiry. The committee recommend that it be discharged, and that the subject be taken up again three or four years hence when we know more about it.

The report is as follows :

REPORT OF COMMITTEE ON STEEL CAR FRAMING.

To the President and Members of the Master Car Builders' Association :

The Committee on Steel Car Framing, appointed at your 1897 Convention to review plans submitted by members of a similar committee in 1897, and to report upon designs for cars of different classes, has endeavored to collect the necessary information to carry out its instructions, but it has succeeded in obtaining dimensions of only one of the frames submitted in 1897 sufficiently in detail to admit of exact and complete calculations of strength. Your committee has obtained blue prints of steel car frames of several designs which were not described in the report submitted last year, but all but two of these designs lack so many dimensions that calculations of their strength could not be made, and, furthermore, attempts made by the committee to obtain further information were unsuccessful.

But twelve members of the Association replied to the circular which the committee issued to elicit information. The questions contained in the circular will be given later, as well as all answers to them which were received. The members who replied to the circular represent 151,828 cars, or about 12.4 per cent of the total number of cars represented by the Association. The number of cars represented by those who replied to the circular and by the members of the committee is 208,389, or about 17 per cent of the number of cars represented by the Association.

The circular of inquiry issued by the committee read as follows:

To the Members of the Master Car Builders' Association:

Your committee on "Steel Car Framing" would be glad to receive any designs for steel car frames which, in your judgment, are worthy the consideration of the committee. Will you please furnish the following information:

1. If you have had any steel car frames in use, please describe all the important facts about them which your experience has brought forth, and furnish working drawings illustrating the frame.
2. Which do you consider preferable for the members of the car frames, rolled shapes of standard commercial sizes or special pressed shapes?
3. Which do you prefer, a car frame made entirely of steel, or a composite frame made of steel and wood?
4. What parts do you recommend be made of wood?
5. What is your opinion of the advisability of using truss rods under side sills of steel car frames? and give the reasons for your opinion.
6. Do you recommend that the draft gear of steel car frames be located between center sills and firmly secured to them, or the use of independent draft timbers below the center sills, similar to the construction which is now generally used on wooden cars?
7. What do you recommend, wooden or steel side and end sills, and what are your reasons therefor?
8. Please give maximum light weight of car, per ton (net 2,000 lbs.), you would recommend for each ton of paying freight.
9. Recognizing the fact that steel car framing will be used in cars of very large capacities, what type of center plate would you recommend, and what maximum bearing pressure, per square inch, would you recommend for carrying the car and lading?
10. What type of side bearing would you recommend for cars of large capacities with steel car framing?

The replies received were as follows:

To question number one: "If you have had any steel car frames in use, please describe all the important facts about them which your experience has brought forth, and furnish working drawings illustrating the same," six individuals and companies reported the results of their experience with steel cars.

To question number two: "Which do you consider preferable for the members of the car frames, rolled shapes of standard commercial sizes or

special pressed shapes?" six replied that they preferred rolled shapes; one preferred pressed-steel shapes except for center sills, which he thinks should be "I" beams; and one replied as follows:

"Would prefer pressed shapes for the following reasons:

- a. The various members can be made of uniform strength by placing the metal where it will be most useful.
- b. The parts can be made lighter in weight.
- c. Better connections for the various parts can be provided for."

To question number three: "Which do you prefer, a car frame made entirely of steel or a composite frame made of steel and wood?" seven replied that they preferred all steel, two preferred steel and wood, and one preferred steel and malleable iron.

To question number four: "What parts do you recommend be made of wood?" one recommended that center sills only be made of steel; another replied that the end sill is the only part which it is allowable to make of wood; another recommended that the floor and the superstructure be made of wood in all cars except coal and flat; another recommended that the floor, sides and ends only be made of wood; another advised as follows: "Would recommend that any parts of car subjected to abrasion or which might be injured by the material to be carried or any covering for the purpose of protecting the load from the action of heat or cold be made of wood. Generally speaking, the covering of superstructure and floors, but not of necessity the framing of superstructure."

To question number five: "What is your opinion of the advisability of using truss rods under side sills of steel car frames? and give the reasons for your opinion," the replies were as follows: Seven recommended that no truss rods be used, one recommended truss rods to support the side sills, and one recommended truss rods if by their use the car can be made lighter.

To question number six: "Do you recommend that the draft gear of steel car frames be located between center sills and firmly secured to them, or the use of independent draft timbers below the center sills, similar to the construction which is now generally used on wooden cars?" ten replied that the draft gear should be placed between center sills.

To question number seven: "Which do you recommend, wooden or steel side and end sills, and what are your reasons therefor?" nine replied that they favored the use of steel end sills, and one recommended wooden end sills.

To question number eight: "Please give maximum light weight of car, per ton (net 2,000 lbs.), you would recommend for each ton of paying freight?" 600, 700 and 800 lbs. are recommended. One member suggested 900 lbs. for coal cars only. In another reply 666 lbs. is recommended for hopper cars to carry iron ore, and 800 lbs. for box cars.

To question number nine: "Recognizing the fact that steel car framing will be used in cars of very large capacities, what type of center plate would you recommend, and what maximum bearing pressure, per square inch, would

you recommend for carrying the car and lading?" three recommended the use of pressed-steel center plates, and one recommended malleable iron. One member recommended that the bearing pressure shall not exceed 1,600 lbs. per square inch, and another 2,500 lbs. per square inch. One member thought that cars should not be center bearing, but that each of the side bearings should support as much of the load as the center plate.

To question number ten: "What type of side bearing would you recommend for cars of large capacities with steel car framing?" six recommended plain side bearings of pressed steel or malleable iron, and two recommended roller side bearings.

Your committee herewith presents designs of cars as described below, which designs are for the most part general and incompletely dimensioned.

Pennock Steel Hopper Ore Car.....	80,000 lbs. capacity.
Pennock Steel Flat Car.....	80,000 lbs. capacity.
Pennock Steel Gondola Car	80,000 lbs. capacity.
Schoen Steel Double Hopper Gondola Car..	100,000 lbs. capacity.
Harvey Steel Box Car.....	80,000 lbs. capacity.
Barr's Steel Underframe for Flat Car	60,000 lbs. capacity.
Sanderson's Steel Underframe for Box Car..	60,000 lbs. capacity.
Norfolk & Southern Steel Flat Car.....	60,000 lbs. capacity.
Great Northern R'y Steel Box Car.....	60,000 lbs. capacity.
Fox Pressed Steel Equipment Company's	
Steel Flat Car.....	100,000 lbs. capacity.
Fox Pressed Steel Equipment Company's	
Gondola Car	100,000 lbs. capacity.

In conclusion, your committee respectfully asks that the foregoing be accepted as a brief statement of the present status of the subject of steel cars, and as a partial history of the development of such cars up to the present time.

The members of your committee believe that at the present time it is impossible to design a steel car frame which will meet with universal favor. The extremely limited extent of the experience which has been obtained with steel cars up to date is alone a sufficient reason for recommending the postponement of the selection of a design at the present time.

Your committee recommends that it be discharged and that the steel car question be considered by another committee of this Association about four years hence.

A. E. MITCHELL, Chairman,
W. P. APPLEBYARD,
WM. FORSYTH,

Committee.

NEW YORK, May 19, 1898.

THE PRESIDENT: Gentlemen, you have the report. What is your pleasure?



R



MR. JOHNSON: I move that the report be received and the committee discharged. (Seconded.)

MR. SIMONS: I can hardly agree with the recommendation of the committee that they be discharged. I am situated in a district where we find it necessary to go into the use of heavy capacity cars, and in order to increase the capacity we must get away from the wooden car. We must use something different. The tendency is toward a car of 100,000 pounds capacity in order to shorten up our trains and bring the load nearer the locomotive. Unfortunately our road has a great many curves, and we find with a light capacity car, in a train consisting of 2,500 tons of load, which we are hauling today, the train hangs back around curves so far as to make quite a drag, and for that reason we want to shorten up our trains and increase the capacity of the cars. Now then, we have started in to build steel cars, and have today in service about eighty, fifty of which have been in service about seven months. Consequently, when the committee asked for information we were unable to give them anything definite. I will say for the benefit of the Association that we also have one car of 80,000 pounds capacity made of rolled section or commercial shapes, and so far—the car has been in service now about a year and a half—it has given exceedingly good satisfaction. In view of these circumstances, then, I believe this committee can be of great service to the Association if it is continued, and obtain such information as it is possible to obtain from year to year and report to the Association. In my estimation the steel car is the coming car. There may be some purposes for which it will hardly be practicable to use it, and I think the committee can give us a great deal of information each year and at the same time find out the weak or the strong points in the cars which have already been constructed. Now, the most important question, it seems to me, in connection with the steel car is the body bolster and the draft gear, and if the committee is continued I trust they will give special attention to those two important features. We have in use on the steel car a draft gear which is made up of lugs riveted to the center sills or center beams, and in those pockets we place two draft springs side by side of 26,000 pounds capacity, and still we find the horn of the coupler is striking the face plate on the sill. In a test made a week ago last Monday with a dynamometer car, we found that with a train of 2,156 tons we had a pull on the drawbar of just a trifle over 35,000 pounds on a 22-foot grade. You see we were 9,000

pounds over the capacity of our draft springs. My impression is that we must get away from the present draft arrangement when we are using heavier capacity cars. I trust that the Association will continue the committee and that it will give us all the information that is possible to be obtained from year to year.

MR. MITCHELL: Mr. President, Mr. Simons is one of the men that did not give us any information. I would suggest that if you are going to have a committee on this subject next year, the man operating the steel car is the very man you want on that committee, as he can see where the weak points are and he can give us some information next year that would be more beneficial than what we could get from parties who are not operating steel cars of heavy capacity. Again, I do not think that one year more of service will demonstrate to us what we want in steel car construction. I think it is going to be a question of each one building cars to satisfy his own design, and then three or four years from now getting the service each car is giving and from that we can probably arrive at some pretty good conclusions.

THE PRESIDENT: Gentlemen, you have heard the motion, which is to receive the report and discharge the committee. All in favor will please say "aye"; contrary, "no."

The motion was carried.

THE PRESIDENT: We will pass No. 10—Subjects for 1899, and leave it to the last until after the topical discussion, as requested by that committee. The next report will be No. 11, on Passenger Car Pedestal and Journal Box for Journal $4\frac{1}{4}$ by 8 inches. Mr. West is chairman.

Mr. West read the following report:

REPORT OF COMMITTEE ON PASSENGER CAR PEDESTAL AND JOURNAL BOX FOR JOURNAL $4\frac{1}{4}$ BY 8 INCHES.

To the President and Members of the Master Car Builders' Association:

Your Committee on Passenger Car Pedestal and Journal Box for Journals $4\frac{1}{4}$ by 8 inches, appointed to report to the Convention held in June, 1897, submitted a report at that time, but certain objections were raised to the inside dimensions of the journal box as recommended. The report was referred to the Committee on Standards of the Association, which submitted the following, through Mr. Soule, chairman of the committee:

"The Committee on Standards, to which was referred the recommendations embodied in the report of the Committee on Passenger Car Pedestal, for axle with journals $4\frac{1}{4}$ by 8 inches, begs leave to report that in its judgment the

Committee on Pedestals ought to be continued, and to be merged into a committee, which, it is assumed, will be appointed on the recommendation already made by the Committee on Standards, to adopt the present standard journal box for use in trucks (whether passenger or freight) having pedestals; the committee so continued to be designated, however, as the Committee on Passenger Truck Pedestal, for axle with journal $4\frac{1}{4}$ by 8 inches, and on journal box for use in trucks (whether passenger or freight) involving the use of the pedestal and axle with journal $4\frac{1}{4}$ by 8 inches."

The committee respectfully reports as follows:

Owing to the wide variation existing between the ordinary Master Car Builders' pedestals now used in passenger equipment trucks and the various pedestals now used in freight trucks, the committee is of the opinion that it is absolutely impracticable to follow the recommendations of the committee on Standards. To meet all objections raised to the wording of the committee's recommendations in last year's report, it respectfully offers the following for consideration; being governed in a great measure by the replies received, the committee has no hesitation in recommending—

1. The adoption of a standard passenger car pedestal for $4\frac{1}{4}$ by 8 inch journals as shown in Fig. 2, which is the same as Fig. 2 with last year's report. This pedestal has the same width and length of jaw inside as the present M. C. B. standard pedestal for $3\frac{3}{4}$ by 7 inch journal box shown on M. C. B. sheet 10, but it has a different design of top and a different location of bolt holes therein.

2. The adoption of a passenger car journal box for use with journals $4\frac{1}{4}$ by 8 inches, with inside dimensions as shown in Fig. 3 herewith. These dimensions admit of the standard $4\frac{1}{4}$ by 8 inch journal bearing and key as used in freight journal boxes. This design, with these inside dimensions, has been in successful use for several years.

GEO. W. WEST,
T. B. PURVES, JR.,
J. W. MARDEN,
E. A. BENSON,
F. W. CHAFFEE,

MIDDLETOWN, N. Y., May 16, 1898.

Committee.

MR. WEST: We have a car weighing about 63,000 pounds, a mail car, that has been running 37 months, 100,000 miles a year, making in all a little over 300,000 miles, and the journals have been reduced $\frac{3}{8}$ of an inch, showing there was $\frac{1}{8}$ of an inch wear to the 100,000 miles. We have never had a hot box on the car.

On motion, the report was received.

THE PRESIDENT: The report is now before you for discussion. You will note the recommendations of the committee. Do you desire to take action on them?

MR. MENDENHALL: I move that the recommendations of the committee be submitted to letter ballot. (Seconded.)

THE PRESIDENT: It is moved that the recommendations of the committee be referred to letter ballot. Are you ready for the question?

MR. WAITT: I think it is highly desirable that we have a recommended practice for pedestal and journal box for pedestal trucks, $4\frac{1}{4}$ by 8 inch journals, but I hope that before this goes to letter ballot one or two little errors in the drawings may be corrected. I think undoubtedly they were unintentional. For instance, in the pedestal drawing it will be noticed that on Fig. 2, the left-hand figure, the size of the hole cored for the bolt pedestal to the truck frame is shown as 1 inch. The same hole shown on the side elevation and section is shown as $1\frac{1}{8}$ inch. I think that should be corrected. Then one other feature: I think the dimensions showing the width of the front face of the projecting lip of the pedestal should be shown. There is no dimension shown, and that which is shown in this pedestal from which this drawing is taken is 1 inch. I think the committee probably intended to show all. That is quite an important dimension to give. Furthermore, it seems to me we ought to carry out the addition of the dimension showing what is intended to be the distance over the wheel pieces. That is shown in our $3\frac{3}{4}$ by 7 inch pedestal, and it would seem, I think, desirable to locate it on this. I suppose that the distance from center to center of wheel pieces is 6 feet 3 inches; the M. C. B. Standard, I suppose, being intended. That being the case, the distance over the wheel pieces would be the same as the Wagner standard and the C. B. & Q. standard, on this style of truck, that is, 6 feet $7\frac{3}{4}$ inches. There is one other thing necessary on the drawing in order properly to locate the center of the jaws, as regards the face of the pedestal, with its center line. Those few dimensions, I think, ought to be added.

There is one inconsistency in the oil box. The figures do not come out right. It will be noticed from the center line where the bearing of the equalizer comes to the back edge of the box it is only $5\frac{5}{8}$ inches. The total dimension showing the space for the dust guard and the thickness of metal inside and outside of that is not given, but presumably it was intended to have that the same as our present weight of box. If you will figure that up, you will find that you add $2\frac{1}{8}$ inches from the center of where the pedestal would go, the center of the oil box, $2\frac{1}{8}$, and the 2 inches that are shown here and the $1\frac{5}{8}$, which is the distance shown in our present standard oil box for the dust guard and the inner and outer thickness of metal,

you will find it comes to $5\frac{1}{8}$ instead of $5\frac{5}{8}$. That ought to be corrected. I speak of this because whatever goes to letter ballot and is likely to be adopted as recommended practice should be consistent. I would suggest before it is submitted that the committee present a plan view, the same as we have of our $3\frac{3}{4}$ by 7 inch pedestal. That is quite desirable, showing the location of the box in the pedestal. I think the plan we have in our present standard should be copied in this new standard, and I would move that the committee be instructed to make these corrections of the dimensions, making them consistent with one another, and put in the necessary dimensions, before it is submitted to letter ballot, so that we could all make our patterns correctly. I think the committee is perfectly competent to do that without any specific instructions as to what the dimensions are.

THE PRESIDENT : Do you make that as an amendment ?

MR. WAITT : I make that as an amendment, yes — that that be done before it is submitted.

THE PRESIDENT : Gentlemen, you have heard the amendment. Are you ready for the question ?

MR. MENDENHALL : I accept the amendment.

THE PRESIDENT : The amendment has been accepted. Will you please state that again, Mr. Mendenhall ?

MR. MENDENHALL : That the recommendations of the committee with the corrections which have been suggested be submitted to letter ballot as recommended practice of the Association.

MR. WAITT : Just one other point. I would like the committee to tell how they get the brass out as shown in this oil box. I think they have shown it wrong end to.

THE PRESIDENT : Gentlemen, you have heard the motion. All in favor please say "aye"; contrary, "no."

The motion was carried.

MR. CLOUD : Here is an announcement : "Members and their families returning to their homes from the convention can obtain transportation upon application to E. A. Benson, Congress Hall, Room 382."

THE PRESIDENT : We will now complete the rules. Is the Committee on Prices ready to report ?

Mr. Bush presented the report of the Committee on Prices, which

was received and discussed, and the revision of the Rules of Interchange was completed. On motion of Mr. Rhodes, the rules as amended were then adopted.

MR. MITCHELL : In the President's address yesterday it was suggested that our Constitution and By-Laws be so amended that the Railroad Commissioners in the various States may become members of this Association. If that is in order now, I would make a motion that the Constitution and By-Laws be so amended that Railroad Commissioners of the several States may become members of this Association, also the Interstate Commerce Commissioners.

MR. CLOUD : That matter is provided for in the Constitution, and could only be received now as a notice to propose changing the Constitution next year.

MR. MITCHELL : I would make that motion, then.

THE PRESIDENT : Gentlemen, you have heard the motion. Are you ready for the question? All in favor please say "aye"; contrary, "no."

The motion was carried.

MR. CHAMBERLAIN : I would move to substitute the word "Wednesday" for "Tuesday" in Article I of our By-Laws, so that they will read, "The regular meeting of the Association will be held on the second Wednesday in June."

The motion was carried.

MR. LEEDS : As there has been a great deal of hardship imposed throughout the country in the attempt to enforce the Master Car Builders' Rules or recommended practice as regards loading of lumber, I have been instructed to bring before this Association a proposed modification of these rules and to ask that the Association take such action as will adopt these modifications. In the first place, if you will remember, the rules were adopted and the committee continued for another year, and the only thing that we could report was that they were all right, and we now find that the only reason why they were all right was from the fact that they were not enforced at any point. As soon as they undertook to enforce the rules, which only occurred since last November, they found hardships, principally on account of technical construction of the rules as they read and not as they were intended by the original committee. That committee now, with the exception of one member, concurs in asking this Association to adopt the modifications as they are outlined, and

in addition thereto, about all of the railroads, in fact all of the railroads that are interested in the loading of such lumber in the southern country. I have also been asked to add a rule in regard to the cleating of stone, staking of cars, etc., and I have had such recommendations and modifications printed and have sent out a great many copies. I have some here that can be distributed very readily, and as the modifications are all in italics there would be very little trouble in looking them over. Since you have appointed a committee to confer with the General Association of Railway Officers, that committee should be instructed to present such modifications and such rules as this Association is willing to adopt, and then to present to the Executive Committee the result of its conference in order to get these rules into effect right away. As it is now, we are forced to work under a modification of the Master Car Builders' Rules, although we have attempted to work strictly to them, and we would very much prefer to have the practice legalized which has been found to be absolutely necessary, and is concurred in by everybody. The rules would have gone through the American Railway Association excepting for the fact that we had found these modifications necessary, and that Association was notified that this Association would modify its rules at this meeting, and consequently the vote was deferred on that until after the meeting of this Association. The printed paper, as subsequently amended, is as follows :

To the Members of the Master Car Builders' Association :

The within rules, as modified, are presented and recommended by the following members of the original committee of the Association :

P. Leeds.	S. P. Bush.	B. Haskell.
W. H. Day.	F. H. Stark.	C. Collier.
P. H. Peck.	J. R. Petrie.	

Also by a special committee appointed by the following roads to represent them in this matter before the Association :

Central of Georgia.	Louisville & Nashville.
Chicago, Ind. & Louisville (Monon).	Memphis & Charleston.
Cin., N. O. & T. P.	Mobile & Ohio.
Fla. Cent. & Peninsular.	Nashville, Chattanooga & St. Louis.
Georgia.	New Orleans & North-Eastern.
Georgia & Alabama.	Plant System.
Georgia Southern & Florida.	Southern.
Illinois Central.	Western & Atlantic.
Kansas City, Memphis & Birmingham.	

Consisting of—

Mr. P. Leeds (L. & N.), Chairman.	Mr. J. E. Capps (G. S. & F.).
Mr. W. H. Peddle (So. R'y).	Mr. Jas. Cullen (N. C. & St. L.).
Mr. F. W. Brazier (I. C.).	

RULES GOVERNING THE LOADING OF LUMBER AND TIMBER ON OPEN CARS.

DETAILED INSTRUCTIONS.

The loading of all classes of lumber and timber on open cars must be in general conformity with the following diagrams :

MATERIAL LOADED ON A SINGLE CAR.

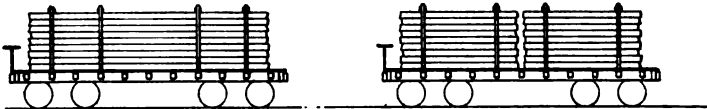


Fig. 1.

Material must be so loaded as to permit the brake at one end to be accessible and operative, and the lading at the other end must not project beyond the end of the car. Four stakes must be placed on each side of the car, and the tops of the opposite stakes must be held together by two boards, as specified. When the length of lumber will admit, it must be similarly loaded in two piles. The marked capacity of the car must not be exceeded *more than ten per cent.*

LOADING PART CARS OF LUMBER NOT LESS THAN 40 AND NOT OVER 65 FEET LONG.

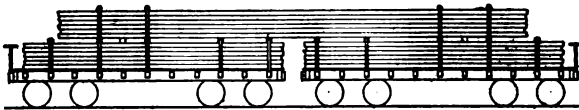


Fig. 2.

When long pieces are to be loaded on top of two cars of short pieces, they must rest on bearing pieces not less than 10 by 10 inches in section, securely fastened across the top lading of each car, and the stakes must extend up as shown and be securely fastened at the middle with wire, *and both they and the short stakes must* be held together at the top with *either wire or boards, as per Rule 7.* The short lumber must be placed centrally on each car, and the bearing pieces must be placed between the stakes and as near the middle of the car as possible, with the following distances from center to center: For lumber 65 feet long, 43 feet; lumber 60 feet long, 40 feet; lumber 50 feet long, 35 feet; lumber 40 feet long, 30 feet. The maximum aggregate weight must not exceed ninety per cent of the marked capacity of the cars, and the amount of long lumber must not exceed one-half the lading.

MATERIAL NOT OVER 42 FEET LONG.

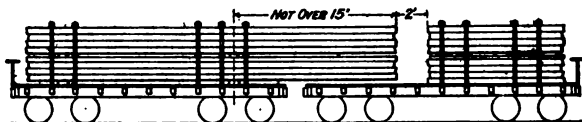


Fig. 3.

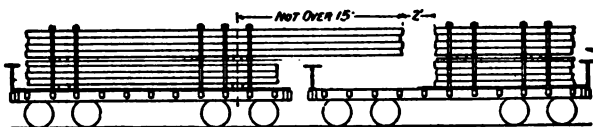


Fig. 3-A

DESCRIPTION OF LOADING AS PER FIGS. 3 AND 3-A.

This material must be carried on one car, either in the manner shown in Fig. 3, when all the material is of nearly equal length, or as shown in Fig. 3-A, when part of the material is long and part of the material is short; the second car in both instances being simply an idler. When the material is loaded in accordance with Fig. 3, the idler must invariably be a flat car, while the car carrying the load may be either a flat car or a drop-end gondola car. When the material is loaded as per Fig. 3-A, the idler may be a gondola car, provided there is a clearance of at least four (4) inches between the bottom side of overhanging material and the top of sides or brake shaft of the idler. The material on carrying car, when loaded as per Fig. 3, must rest on bearing pieces not less than eight inches wide, and of sufficient thickness to keep the ends of lumber at least four (4) inches above the floor of the idler, and in length equal to the full width of the car, to prevent the lading from touching the idler so that the cars can curve freely. These bearing pieces should be placed directly above the bolster, or as near to it as possible, but never between it and the end of the car. When the material is loaded as in Fig. 3-A, no extra bearing pieces are required on the floor of the carrying car, as the short material loaded underneath the long material will take the place of the bearing pieces. The lading overhanging the idler must not, with either style of loading, project more than fifteen (15) feet from the center of the car bolster, so that the ends will not project too far beyond the side of the car in curving. Short material may be loaded on the idler to the extent of two-thirds of its marked capacity, or the idler may be utilized in accordance with General Instructions, paragraph 3. The five stakes on each side of the carrying car should be placed as near the bolster as possible, and no stakes whatever should be used on the idler to sustain the overhanging part. The only stakes permitted on the idler will be such as may be required for the short lumber loaded on the idler. All stakes should be fastened as described in General Instructions, paragraph 7, and there must be a space of at least two (2) feet between the lading of the two cars. As the load on one truck of the carrying car is in excess of that on the other, and in direct proportion to the load on bearing pieces and the overhang, care should be taken in all cases to load as

near to the brake shaft on the carrying car as possible, but leaving the brake accessible and operative. When loaded in this manner the following are the maximum lengths and weights which may be carried on cars of given length and capacity :

LENGTH OF CARS.	LENGTH OF LUMBER.	MAXIMUM WEIGHT OF LOAD.		
		Capacity of Cars, 40,000 lbs.	Capacity of Cars, 50,000 lbs.	Capacity of Cars, 60,000 lbs.
30 feet	30 feet.	38,000 lbs.	46,000 lbs.	57,000 lbs.
	32 "	35,000 "	42,000 "	53,000 "
	34 "	32,000 "	39,000 "	49,000 "
	36 "	30,000 "	37,000 "	45,000 "
32 feet	32 "	38,000 "	47,000 "	58,000 "
	34 "	35,000 "	44,000 "	54,000 "
	36 "	32,000 "	41,000 "	50,000 "
	38 "	30,000 "	38,000 "	47,000 "
34 feet	36 "	36,000 "	45,000 "	55,000 "
	38 "	34,000 "	42,000 "	51,000 "
	40 "	32,000 "	39,000 "	48,000 "
	42 "	30,000 "	37,000 "	45,000 "

MATERIAL 40 TO 70 FEET LONG.

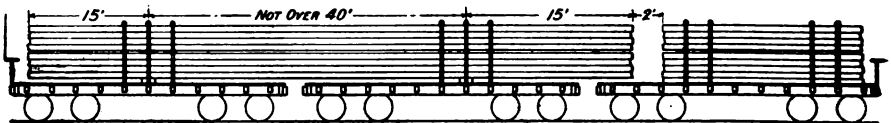


Fig. 4.

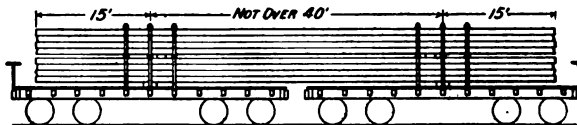


Fig. 5.

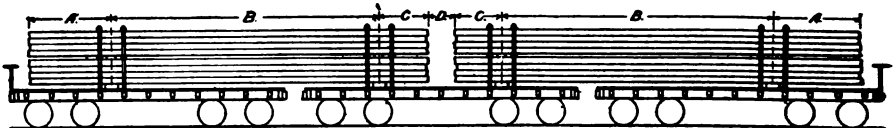


Fig. 6.

DESCRIPTION OF LOADING AS PER FIGS. 4, 5 AND 6.

This material may be loaded on two or three cars of any length, as per Figs. 4, 5 or 6, according to the quantity and lengths of material to be loaded, provided that the two end brakes are kept accessible, and the same relative proportions in the spac-

ing of bearing pieces, distance between the ladings and overhang of material are maintained, as per the following tables, which refer to Fig. 6 exclusively. The application of these tables will allow of the loading of lumber 60 feet long at one end and 40 feet at the other, or with intermediate lengths; but when so loaded the maximum aggregate weight of load must be reduced to 10,000 pounds less than given in the tables:

WHEN LOADED ON CARS 34 FEET LONG.					MARKED CAPACITY OF CARS.	MAXIMUM AGGREGATE WEIGHT TO BE CARRIED.
Length of Lumber.	A	B	C	D		
40 ft.	10 ft. 3 in.	24 ft.	5 ft. 9 in.	10 ft.	40,000 lbs.	90,000 lbs.
45 ft.	11 ft. 9 in.	27 ft.	6 ft. 3 in.	6 ft. 6 in.		
50 ft.	13 ft.	30 ft.	7 ft.	2 ft. 6 in.		
60 ft.	17 ft.	33 ft.	10 ft.	2 ft.		
WHEN LOADED ON CARS 30 TO 32 FEET LONG.					50,000 lbs.	105,000 lbs.
40 ft.	10 ft. 3 in.	24 ft.	5 ft. 9 in.	8 ft.	60,000 lbs.	120,000 lbs.
45 ft.	11 ft. 9 in.	27 ft.	6 ft. 3 in.	4 ft.		

When loaded as per Figs. 4 or 5, the loading must not exceed two-thirds of the marked capacity of the two carrying cars. When loaded as per Fig. 4, short material may be loaded on the idler to the extent of two-thirds the marked carrying capacity of that car. The stakes should be fastened together, as described by General Instructions, paragraph 7, except that the short lading may be secured as described in Fig. 1.

MATERIAL 70 TO 100 FEET LONG.

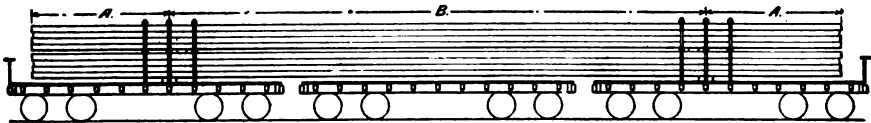


Fig 7.

This material must be loaded on three cars. The lading must rest on bearing pieces not less than 10 by 10 inches in section, placed equally distant from the center of bolster on both carrying cars, and the lading equally divided on them. There must be at least three stakes placed as near together as possible on each side of the carrying car, securely fastened together, as described in General Instructions, paragraph 7. These stakes should either be made of material eight (8) inches wide, and of sufficient thickness to fill the stake pockets, and gaped at the bottom so that they will extend onto the flooring of the car, or, after the standard stakes are in place, pieces 4 by 4 inches in section must be securely fastened to the inside of each stake. This narrows the space for lading eight (8) inches, and permits a greater overhang at both the ends and middle of the lading, without a dangerous projection beyond the

sides of the cars when they are passing around curves. Stakes or bearing pieces must not be used on the idler, and the lading must not be allowed to touch it. The following table of proportional distances between the bearing pieces, and the proper overhang for lumber of different lengths, must be observed; and when so loaded the maximum load for lumber of less than ninety (90) feet must not exceed one-half the marked capacity of the two end cars, but for lumber of ninety (90) feet and over, two-thirds of the marked capacity of these two cars will be allowed:

Length of lumber,	70 feet	.....A, 10 feet.	B, 50 feet.	A, 10 feet.
"	"	80 "A, 14 "	B, 52 "	A, 14 "
"	"	90 "A, 16 "	B, 58 "	A, 16 "
"	"	100 "A, 18 "	B, 64 "	A, 18 "

LOADING MATERIAL ON GONDOLAS.

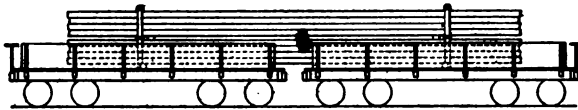


Fig. 8.

Long material may be loaded on gondola cars that have drop end gates, provided that when loaded on two cars, bearing pieces of not less than 8 by 8 inches are used to keep the lading clear of the end gates and floor by at least three (3) inches, and in addition to the bearing pieces on the floor there is a clearance of at least eighteen (18) inches between the load and the car sides to provide for curving. This clearance may be obtained by the use of stanchions, not less than 4 by 5 inches in section, placed in a vertical position, and securely fastened by cleats to the floor bearing pieces in such a manner as to make the floor bearings serve as a brace between them, and be fastened together as described in General Instructions, paragraph 7. Not more than two gondolas must be used together, and the lading must not exceed *two-thirds* of the marked capacity of the *two* cars.

CHAINING OF CARS WHEN LOADED WITH LONG LUMBER.

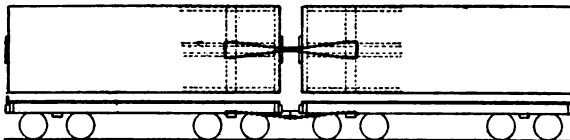


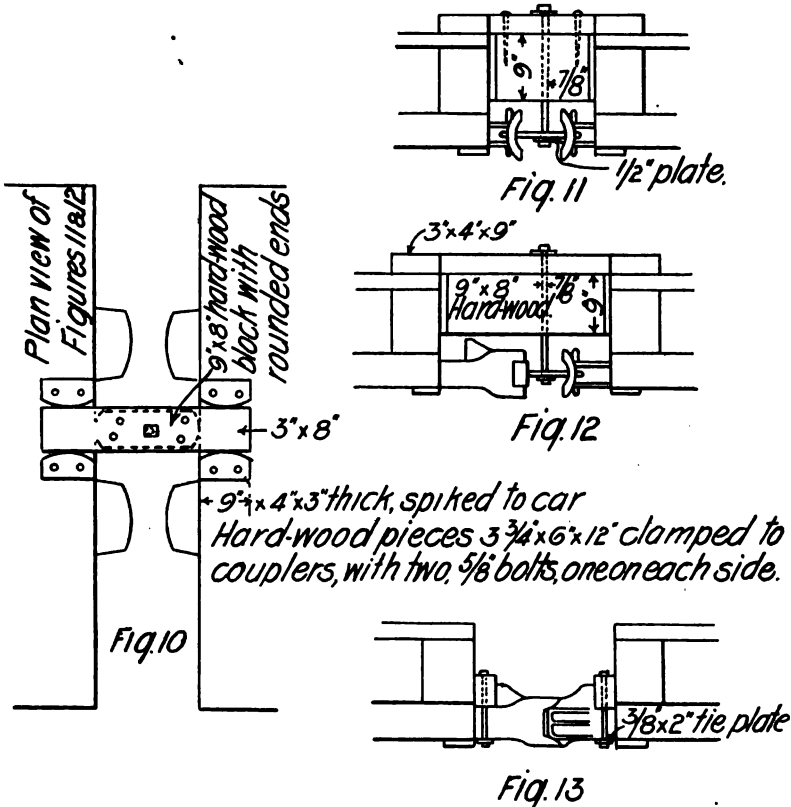
Fig. 9.

The use of chains is optional. On such roads as require their use, cars must be chained together with chains made of not less than three-quarter ($\frac{3}{4}$) inch iron passing over body bolsters and across under sills, forming a loop back of bolster and doubling to point of coupling between the two cars, as per Fig. 9, unless cars are provided with safety chains. These chains should be made as short as possible with-

out taking the strain off of drawbars when springs are compressed. At interchange points chains will either be removed, or the receiving road will furnish the delivering road with chains of the same quality and dimensions as those received.

METHOD OF BLOCKING CARS APART.

Whenever the lading is carried on more than one car, all slack between the cars must be removed by the use of spacing blocks, as shown in Figs. 10, 11, 12 and 13. In blocking cars apart they must be separated until all slack is taken up. The spacing blocks must then be neatly fitted between the cars and secured in the manner shown. All wood must be sound yellow pine or its equivalent as a hardwood.



GENERAL INSTRUCTIONS.

1. When two or more cars are required to carry the lading, the consignee and destination of all the material must be the same. When more than one car is used, the lading must always be kept clear of the floor of the cars, whether a carrying car or an idler. Both cars carrying the load must be considered of the same capacity as the one of lesser capacity. Flat cars must always be used for loading lumber too long for one car, except as specified in Figs. 3, 3-A and 8. On single cars, or in the end cars of a group of cars, the lading must not extend beyond the end sills.

2. If the lading consists of piles or telegraph poles or other round timber, they must be loaded with the butts and tops alternating, and if the lading occupies two or more cars, *it must rest on bearing pieces of not less than 8 by 8 inches in section and each tier must be separated by strips over the bearing pieces and be well wrapped with wire around the middle and both ends to prevent shifting.* In all cases there must be at least *three* pairs of stakes at each end of lading, securely fastened *with wire*, as described in General Instructions, paragraph 7.

3. Where the lading projects so as to necessitate the use of an idler, and there is sufficient material in one consignment, another car may be loaded in reverse order and one idler serve for both cars, and the space between the projecting ends may be utilized to load the idler with short lumber; but in all cases there must be at least two feet between the ends of such loadings. The lading of the idler must not exceed two-thirds its marked capacity.

4. Where the dimensions of bearing pieces are not otherwise specified they must be not less than 8 inches wide and of sufficient thickness to keep the lading at least four inches clear from the floor, and extend the full width of the car. When the height of the bearing pieces are specified as over 5 inches, the additional height may be obtained by the use of a plank securely nailed to the upper side of bearing pieces. The bearing pieces must never be placed between the bolster and the end of the car, but either between the bolsters or directly above them. When there is but one bearing piece on the car, it must be placed at a distance of at least 12 inches from center of bolster toward center of car.

5. Where the maximum weights are not specified in these instructions, the usual excess will be allowed.

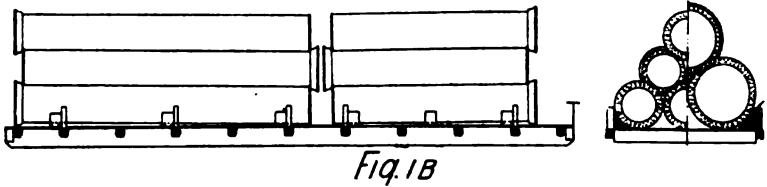
6. All stakes must be sound, straight-grained lumber, free from knots *that would materially impair their strength* (hardwood preferred), and of full size to reasonably fit the stake pockets. All spacing blocks between cars to be made of hardwood, and sound in every way. Care must be taken to keep the stakes from spreading at the top while cars are being loaded, and in no case must the load exceed the width of the car.

7. Opposite stakes must always be fastened together *at the top with either wire or boards.* In cases where the lumber is confined to one car, and does not project beyond the end *more than one foot or is less than three and one-half feet high and does not project beyond the bearing pieces more than nine feet*, the stakes should be secured at the tops only. *In cases where the load is more than three and one-half feet high and projects beyond the bearing piece more than six and less than nine feet*, the stakes at the projecting end must be secured at the tops with wire. *When the load is more than three and one-half feet high and projects beyond the bearing piece*

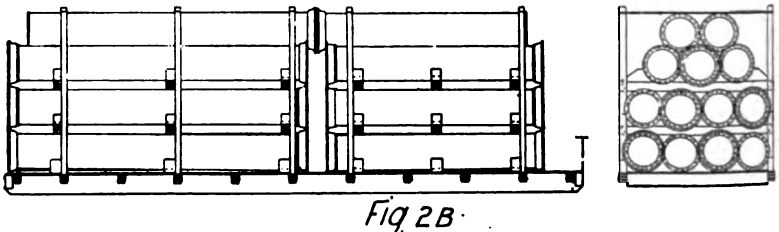
more than nine feet, or where the load is more than four feet high and projects more than six feet beyond the bearing piece, or is carried in two or more cars, the stakes must be secured in the middle with wire, and at the top with either wire or boards. The wire used should be equal to six strands or three wrappings of No. 8 telegraph wire, and the stakes must be notched to prevent the wire from slipping. When boards are used there must be two to each pair of stakes 1 by 4 inches in section, securely nailed to each side of the stakes with not less than two ten-penny nails on each side and end. When stakes are wired at the middle there should be a bearing piece across the lading of such size as to keep the material apart sufficiently to protect it from injury by these wires.

8. *All cars must be so loaded as to leave the brake accessible and operative. There must be a clearance of at least four inches between the brake wheel and the lumber — one brake for one or two cars, and two brakes for three or five cars.*

RULES FOR LOADING LARGE LOGS, PIPE AND STONE ON
OPEN CARS.



All logs or pipes twenty-four inches and over in diameter must be loaded in pyramidal form, as shown in Fig. No. 1-B, with the large ends of the first course toward the end of car, and securely blocked with three pieces on each side of each pile not less than eight (8) inches thick and one-third the diameter of the logs or pipe in height, neatly fitted to and driven under the outside of the logs or pipe, shouldered or beveled at the outer end and securely fastened to the floor of the car and stakes with four (4) twenty-penny nails to each block, two through the end, and one properly toe-nailed through each side of the block. Blocking of more than fourteen (14) inches in height will not be required, but on loadings of material three feet and over in diameter there must be an additional blocking formed by a plank of not less than two (2) inches thick, fitted under the outside of lading and spiked to each stake with four (4) twenty-penny nails, as shown at A. There must be stakes of not less than fifteen inches high above the floor of the car, placed near the ends of each pile of lading on both sides of car, the quality and fitting of such stakes to conform to rules for loading of lumber.



Logs or pipes of less than twenty-four inches in diameter may be loaded as per Fig. No. 2-B. The first course must be loaded as per Fig. No. 1-B, except the wedges may be only six (6) inches thick. Each course above this must have bearing pieces of not less than 6 by 6 inches in section, extending across the lading and secured to the stakes with two (2) twenty-penny nails at each stake. Upon top of these bearing pieces, blocking of the same description as those on the floor must be placed and secured in the same manner. There must be a pair of stakes near each end of each pile, and when the material is more than twelve and less than eighteen

feet long, or more than four feet high, there must be an intermediate pair of stakes. When over eighteen feet long there must be four pairs of stakes. All stakes must be fastened together at the tops with wire.

The methods of fastening and quality of stakes to conform to the rules for same governing the loading of lumber.

CLEATING OF STONE.

All stone-loaded on flat cars must be cleated with strips of not less than one and one-half inches thick by four inches wide, securely fastened to the floor of the car with one (1) twelve-penny fence nail to every nine inches, such nails to be staggered so as to be within one inch of the edge of the strip alternately.

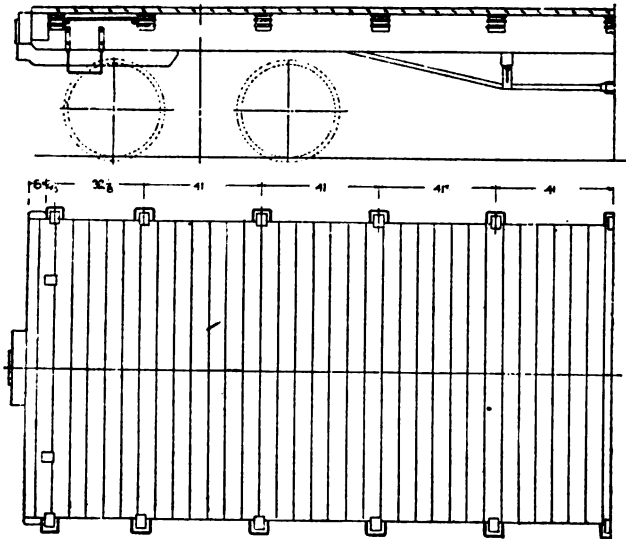


FIG. 3B.

ARRANGEMENT OF STAKE POCKETS.

Stake pockets to be spaced so that there will be two stakes at each end of car through floor and against the inside of the end sill. On the sides, the end pockets to be placed so that the inner side of stake will come on a line with the stakes at the end, as shown on Fig. 3-B, the balance of the pockets to be spaced so as not to exceed forty-two (42) inches from center to center.

MR. JOHNSON: I would like to ask if these papers have been distributed through the country.

MR. LEEDS: They have been distributed through the mail, but there is a lot of them here. The most important feature is that the

committee that has been appointed on the loading of lumber should get it before the Association through the Executive Committee, and so to letter ballot, as an action of this year's convention; always conditionally that there may be other modifications or additions after conference with the American Railway Association.

MR. WAITT: Mr. Chairman, in line with the recommendation of Mr. Leeds, I would make the following motion: That the Executive Committee be instructed to appoint a committee after the close of this convention to take up the matter of the revision of these rules, considering all the papers that the Committee on Standards can turn over to them, and to confer with a similar committee to be appointed by the American Railway Association, who desire to consider the matter with them; to report to the Executive Committee and the result of the report to be made known to the members of the Association as early in the year as possible.

MR. STARK: Mr. President, I trust that this question of loading long materials will receive consideration here today. I would like to ask Mr. Leeds whether he has included in the correspondence which he has in hand to turn over, the question of loading long rails?

MR. LEEDS: Inasmuch as I had not enough of them to distribute, I was waiting for these to be distributed, and then I proposed to ask the Secretary to read the proposition that was made in regard to rules. I have spoken specifically and only of the loading of material, but some of the large Eastern roads have made suggestions in regard to the loading of rails, and under this motion of Mr. Waitt's I should turn it over to the Executive Committee.

MR. WAITT: I might make the explanation that Mr. Stark will understand my motion referred to the collection of papers in the hands of the Committee on Standards which accumulated during the year referring to the present rules covering the matter of the loading of rails and the loading of logs and things of that kind as shown in these papers. I think that will all be covered in the correspondence so that everyone of these points will be satisfactorily taken up.

THE PRESIDENT: Gentlemen, you have heard the motion. Are you ready for the question?

MR. SCHROYER: I would like to ask Mr. Leeds if the recommendations contained in these sheets here are not the result of the meeting between our members and members of the American Railway Association. Is that the case?

MR. LEEDS: Practically; yes, sir.

MR. SCHROYER: Then, if that is the case, I see no occasion for appointing a committee to again confer with them on that subject.

MR. LEEDS: We are blocked right there from the very fact, in the first place, that we have been requested by the American Railway Association to appoint a committee to confer with them, and the Committee on Standards recommended that such a committee be appointed, and now what I am trying to get at is that that committee shall report to the Executive Committee and shall get it before the Association for letter ballot as part of the proceedings of this convention. The American Association has practically placed us in a position where it would have to go over another year under the present ruling.

MR. SIMONS: While this question is being considered, I would state that a few days before leaving home my attention was called to the method of blocking the drawbars between the cars equipped with M. C. B. couplers; that is, blocking them back of the horn. We find that in loading long rails, 60-foot rails, or structural material, that the loading is liable to slide and that the block is crushed to pieces. Now, it seems to me the better way to block the cars would be as shown in Fig. 12. If the committee is to consider this further, I would suggest that that matter be given consideration. We find we get better results by blocking cars that way than we do by putting the block back of the horn of the coupler.

MR. STARK: Our experience in making shipments of long rails has shown that the blocking as per Fig. 21 in the Rules of Recommended Practice, or Fig. 13 in this, is of little advantage. As Mr. Simons has said, the block is crushed and offers no means of resistance. Most of our connections, in fact all but two, are running double loads of steel rails with that block omitted. It is not found absolutely essential on most roads to have any blocking whatever when loaded with steel rails. The blocking of cars apart has suggested the disconnecting of the M. C. B. coupler operating lever, and that is undesirable, as the couplers would not be operated.

THE PRESIDENT: Are you ready for the question? All in favor please say "aye"; contrary, "no."

The motion was carried.

THE PRESIDENT: That is, that the matter is referred to the Executive Committee.

We will now take up the remainder of the topical questions.

6. *"Side Bearings. A consideration of the increased resistance of cars, due to a large amount of the weight being carried on side bearings, and the best means for overcoming this difficulty."*

MR. MITCHELL: On the question of side bearings I have some data here that might be of interest to the Association. In November, 1897, we made a test with a dynamometer car on two trains, one of which contained a tonnage of 2,115 tons and the other contained a tonnage of 2,114 tons, a difference of only one ton. We had a dynamometer car on the train next to the engine, and the percentage of center-bearing trucks — that is, cars equipped with Fox trucks and metal body bolsters — on one train was one hundred per cent. Every car in the train had metal body bolsters, metal trucks, strictly center bearings; no pressure on the side bearings. The other was composed of diamond trucks, only twelve per cent of which were center bearing. There was no wind blowing, and both days on which the tests were made were as nearly alike as possible. The make-up of the trains was as follows: Number of cars in the first train, 22; in the second, 23; number of loaded cars in the first train, 21; in the second train, 22; number of empty cars in each train, 1. Length of first train, 834 feet; length of second train, 866 feet. Average draw-bar pull, pounds per ton, in first train, 12.83; in second train, 13.89; or 7.6 per cent decrease in favor of first train. The average speed, miles per hour, first train, 11.97; second train, 11.13; an increase in favor of the first train of 7.5 per cent. The average boiler pressure, pounds per square inch, first train, 128.7; second train, 127.03; or an increase in favor of the first train of 1.1 pounds. The average reverse lever position, number of notch, in the first train, 10.17; second train, 9.3; or an increase in favor of the first train of 9.3 per cent. The average coal burned per hour of actual running time, in pounds, first train, 2,915.4; second train, 3,177.5; a decrease in favor of the first train of 8.3 per cent. The average coal, per ton to the train in pounds, first train, 5.676; second train, 8.038; or a decrease in favor of the first train of 29.4. These figures show you the enormous saving which can be made if the cars are all center bearing.

THE PRESIDENT: Is there any further discussion? If not, we will proceed to the next, which is No. 7:

"Air-brake details for freight cars. A consideration of the

advisability of securing uniformity in details of air brakes on all classes of cars, and the possibility of adopting standard forms for piping; also a consideration of better designs of piping, whereby all elbows would be omitted, and bends of large radius substituted."

The discussion to be opened by A. L. Humphrey.

MR. HUMPHREY: Mr. Chairman and Gentlemen,— At this late hour of the convention I would not impose on your good nature by entering in any detail into this discussion. This is an important subject, however, and it seems to me that this is an opportune time for it to be considered. We learn from the report of the Interstate Commerce Commissioner that approximately only about forty per cent of the cars of the United States and Canada have been equipped with air brakes. So it seems to me that now is the proper time to adopt, if possible, a standard for the application of air-brake appliances so that the equipment could be more uniform throughout this country. I do not know that this question, so far as it applies to standards, is paramount to any other question, but I believe there are abuses arising from inferior work and the inferior material that is being used in this particular instance, greater than in many other ways. Now, having considerable experience in mountain roads where we depend on the air brakes as much as we do on the use of the locomotive, we find in that country the weak points in connection with the air brakes more than those that are operated on a level road, and I believe that members of this Association would be astonished if they knew of the trouble that is being experienced on the Western roads, and I believe I might say the roads that are operated on a level, if they would take pains to investigate the amount of trouble that the car men are experiencing in keeping the air-brake attachments intact. As an illustration, I will refer to the matter of retaining valves. A discussion came up a few days ago in regard to the application of them. If a retaining valve is applied to a car, that retaining valve must be effective or it is of no use. Just before coming to the convention I had the inspectors at one point keep a record of a little over 1,500 cars, to see how many of the retaining valves were really effective. Out of that 1,500 there were 137 retaining valves that would retain the pressure, and inside of three months there was not ten per cent of the 1,500 cars, which were promiscuous — they were cars of nearly all roads operating throughout the country — there was not ten per cent of them on which the retaining valves were of any value whatever, and the rest might just as well have

been off the cars as on them. Now I do not believe it is the general practice of the roads in this country to test the retaining valves as they do the triple valves. If a test were made, they would then see the inefficiency of the valves as they are at present applied. I was surprised, when I came to investigate this, to find a great many of the retaining valves placed on an angle that entirely does away with the efficiency of the valve. The plug does not close, so that it cannot retain the pressure. Then the pipe would be connected with several joints, and if there is the smallest leak in any one of those joints you can see how quickly the pressure out of that three-eighths pipe will release. I hope a committee will be appointed to go into this matter in detail, and report a standard before the next convention, so as to do away with as many of the joints as possible in the train pipes, and try to adopt a large radius in the place of the different connections, so that it will be reduced from what it is at present, about nine to twelve joints. Each of these joints is liable to work loose. As I understand from those who were present at the Burlington test, it was necessary at times to stop and tighten the train pipes during the time they were conducting these tests, and I know that it is a positive fact, where we take trains down grades of three and four per cent for thirty or forty miles, that it is often the case, where the cars leave the top of the grade in perfect condition, we have to stop before we get down and tighten different joints in the train pipes that spring loose and commence to leak, on account of the inferior workmanship and material in their fastening to the cars. We are working in the right direction, and if a committee is appointed on pipe fittings, I hope that that committee, that will report before the next convention, will also report specifications for pipes, and the best means of applying and securing them. [Applause.]

THE PRESIDENT: Is there any further discussion on the subject? If not, we will proceed to No. 8.

- "Axles. (a) Design of axle for cars of 100,000 pounds capacity.
(b) Revision of the design of axle for cars of 60,000 pounds capacity.*

Discussion to be opened by Mr. E. D. Nelson.

MR. CLOUD: I have a letter from Mr. Nelson under date of June 14, as follows. [The letter was read.]

MR. CHARPIOT: If it is in order, in regard to that 80,000-pound capacity axle recommended last year, the Central of Georgia has for the last twenty years used a collarless axle, and the practice has been

continued, and we have endeavored to keep within the lines of the Master Car Builders' recommended practice. It might be well for the Association, perhaps, to consider the conditions that arise, which we think are very much in favor of the collarless axle. For instance, in the design of an 80,000-pound axle, where it is not necessary to extend the distance from center to center, from 6 feet 3 inches to 6 feet 4 inches, and where we reduce the axle from 7 feet 2½ inches over all to 7 feet and ¼ inch over all, we have a brass which is 9 inches long and which gives us a pressure per inch of 411 pounds as against 469. Of course, in this method of bearing the wedge is not used, and the brass is made so as to fit the top of the box, which is hexagonal. I have a drawing, if anyone wishes to look at it, which I will submit to the Association.

MR. CLOUD: I would like Mr. Nelson's communication to be treated as a report and printed in the Proceedings, at least.

MR. RHODES: I move that the report just read be accepted and spread on our minutes. (Seconded.)

THE PRESIDENT: Gentlemen, you have heard the motion. Are you ready for the question?

MR. JOHNSON: Before the question, Mr. President, ought not that to be turned over to the Committee on Standards?

THE PRESIDENT: No. This motion is simply to accept it and have it printed in the Proceedings. Are you ready for the question? All in favor please say "aye"; contrary, "no."

The motion was carried.

The communication is as follows:

Mr. J. W. Cloud, Secretary, Master Car Builders' Association, Congress Hall, Saratoga, N. Y.:

DEAR SIR,—I had expected up to within a day or two to be able to attend the convention at Saratoga, but now find that it is impossible for me to do so. The Committee on Subjects for 1899 included in its report a topical discussion of the question of an axle for 100,000-pound capacity cars, and a revision of axle for 60,000 pound capacity cars. When this matter is brought before the convention, I would be very glad if you would present the following considerations:

First — In regard to the axle for cars of 100,000 pounds capacity, there are now being built by one railroad company, of which I have knowledge, one thousand cars of 100,000 pounds capacity, and I think that there is one other railroad which has in use about an equivalent number of cars of this same capacity.

It has occurred to me that in view of these facts and the possibility of other companies building cars of this capacity, it would be well for the Master Car Builders' Association, as early as possible, to settle upon a design for an axle for

these cars. If the matter is left open for another year, it is quite possible that other companies will design axles which will vary somewhat, and sufficient possibly to prevent their being used interchangeably.

I have, therefore, without any authority from the Association, taken the liberty of designing an axle for a 100,000-pound capacity car, and would respectfully suggest to the Association the advisability of adopting this as recommended practice at the present convention. A committee should then be appointed to make a report upon it at the convention of 1899; or if the convention sees fit, after deciding to adopt the axle as recommended practice, to refer the question to the Committee on Standards for recommendation for adoption.

In designing the axle for a car of 100,000 pounds capacity, I would say that the method outlined in the report of the Committee on Axle, Journal Box, Bearing and Wedge for Cars of 80,000 pounds capacity, made to the convention of 1896, has been followed. It will be remembered that this report contained a full description of the method to be followed in the designing of car axles, and the axle for cars of 80,000 pounds capacity was simply an application of the general principles involved, in order to arrive at an axle for cars of that capacity.

The method pursued, therefore, for the axle of cars of 100,000 pounds capacity is the same as contained in the report of the committee referred to; and since it is probable that the recommendation of the Committee on Standards that this axle be adopted will be passed by the convention, it would apparently indorse the method pursued by the committee reporting in 1896.

It is, therefore, only necessary to mention the assumed data for the axle intended for 100,000-pound capacity cars, in order that the convention may be able to fully criticize the axle submitted.

This data is as follows:

Weight of body and trucks.....	40,200 pounds
Weight of lading.....	100,000 "
20 per cent additional lading.....	20,000 "
Total.....	160,200 pounds
Deduct Weight of eight 33-inch wheels.....	5,000 pounds
Weight of four axles.....	3,200 "
Total.....	8,200 "
Total weight on four axles.....	152,000 "
Static load on one axle.....	38,000 "

In order to find the point at which the load must be considered as acting on the journals, it is first necessary to consider the dimensions of the latter.

The Master Car Builders' axle for 40,000-pound cars is 7 inches long; for 60,000-pound cars 8 inches long; for 80,000-pound cars 9 inches long. It might, therefore, be assumed that for cars of 100,000 pounds capacity the journal should be 10 inches long.

We can suppose for the purpose of maximum conditions of wear, that the collar of journal should be worn off $\frac{1}{2}$ inch in thickness from contact with the bearing, and the bearing worn off $\frac{3}{4}$ inch on the end next to the collar. The journal would then be $10\frac{1}{2}$ inches long and the bearing surface on the journal bearing would be $8\frac{1}{4}$

inches long. This would throw the center of bearing surface $1\frac{3}{8}$ inches outside of the normal center line of journal.

Referring to Fig. 6, page 167 of the Proceedings of 1896, the lever arm T would be, therefore, equal to $6\frac{3}{8}$ inches; and assuming this lever arm $\frac{1}{2}$ inch greater on account of the dust guard seat being reduced $\frac{1}{2}$ inch in length, it would make the value of T $6\frac{7}{8}$ inches.

By substituting in formula 12, page 153, and calculating the moment from the above dimensions, we find the diameter of the journal to be 4.98 inches. Taking the nearest eighth of an inch above this theoretical diameter would make the journal 5 inches; and allowing $\frac{1}{2}$ inch for wear would make it $5\frac{1}{2}$ inches.

Assuming the journal, therefore, to be $5\frac{1}{2}$ by 10 inches, it is found that, so far as friction and lubrication are concerned, we have the following data, in connection with page 169 of the Proceedings of 1896:

$4\frac{1}{4}$	by 8 inch journal, new; pressure per square inch.	449	pounds.
5	" 9 " " " " " " " "	469	"
$5\frac{1}{2}$	" 10 " " " " " " " " "	470	"
$4\frac{1}{4}$	" 8 " " worn to limit of $3\frac{3}{4}$ inches.	533	"
5	" 9 " " " " " " " " "	525	"
$5\frac{1}{2}$	" 10 " " " " " " " " "	516	"

These figures would indicate to my mind that the size of journal from the standpoint of friction and lubrication is all that need be desired.

It is now only necessary to arrive at the design of axle between wheels, and assuming the point of concentration of load as the same as that selected above for calculating the diameter of the journal, and applying the figures for weight as previously assumed, the theoretical diameters of the vital points of the axle between the wheels are as follows: Wheel seat, 6.70 inches; center, 5.73 inches.

Taking the nearest eighth of an inch above these figures, and allowing $\frac{1}{8}$ inch on wheel seat for reduction of same, we have for diameter of wheel seat $6\frac{7}{8}$ inches, and for center $5\frac{7}{8}$ inches.

The nearest eighth of an inch above the theoretical diameter at center given above, would actually be $5\frac{3}{4}$ inches; but by making the center of the axle straight for 6 inches, which is considered desirable, it is necessary to increase this diameter in order that the straight portion of the axle at the center may not intersect the tapered portion at a point which would give a diameter less for that particular point than the theoretical diameter.

The assumptions for fiber stress have been taken at 22,000 pounds per square inch for that portion of the axle between the wheels, and 10,000 pounds per square inch for strength of journal; and the actual fiber stress based on the dimensions given above is safely within these limits.

I would be very glad if you would present this matter at the informal discussion, and also after the discussion request the Association to consider the matter of adopting the axle as recommended practice.

Second—In regard to the revision of design of axle for 60,000-pound capacity cars, it will be noted on page 183 of the Proceedings of 1896, that the Master Car Builders' axle with $4\frac{1}{4}$ by 8 inch journals has a fiber stress at the hub, when reduced $\frac{1}{8}$ inch in diameter, of 24,030 pounds; at the center of 22,452 pounds; and it was with the idea of making this axle somewhat larger at the hub and slightly

larger at the center that we suggested that the present design be revised. This would not involve any changes affecting the interchangeability of these axles in freight cars.

Yours respectfully,

E. D. NELSON, *Chairman.*

MR. CHARPIOT: I would like to inquire, if there is going to be a committee appointed to revise the outline of the axle, whether it would not be well for that committee to consider the features of the collarless axle. We have got a large number of collarless axles, and as a matter of fact there is not more than possibly twenty-five per cent of even the members of the Association who follow out in every respect the standards of the Master Car Builders. They vary either in wedge or in brass or in something or other, and it might be well for the committee to go through a process of investigation that would cover all brasses and particularly the one covering the collarless axle, which we consider has features which are well worthy of the thought and the consideration of the Association.

THE PRESIDENT: I would say that that matter is in the hands of the Committee on Subjects, which has not reported as yet, so that we cannot say what their report will be.

If there is no further discussion, we will proceed to No. 9:

"Owing to the fact that within a comparatively short time all of the freight cars in the country will be equipped with Master Car Builders' couplers, should not the present limits for height of draw-bars be modified?"

Discussion to be opened by Mr. Schroyer.

Mr. Schroyer read the following discussion:

Where cars that are equipped with both automatic and link-and-pin bars must be coupled together the element of danger is increased in proportion to the variation in height of draft lines, due to the limited space in the opening of the knuckle face. These conditions are changed when there is no longer any necessity to go between the cars to use the links. I am of the opinion that the limit of three inches now allowed by law may safely be increased without in any way increasing the element of danger to life or limb in handling the cars. This being so, the questions involved, aside from the legal ones, are of a mechanical nature, and the handling of the cars safely in the movement of trains.

I believe you are all familiar with the troubles, delays and expense now occasioned in maintaining the heights required. This is due to the amount of wear the wheels, journals and brasses are subject to. The additional lowering due to set of springs, both permanent and under the load, the shrinkage of sills and draft timbers, the loosening of bolts and nuts, the bending of carrier irons, the manner of trimming load, etc., all affect the draft line to such an extent as to lower it below the minimum limit of cars built to 34½ inches, thus necessitating their raising within a very

short time. This in many cases must be done in a makeshift manner, unless construction is such as to enable change to be made without blocking.

Natural wear of parts, shrinkage of timbers, set of springs is so great that cars in service two or three years require raising.

The face of the knuckle will average in width about 9 inches. When two cars are coupled together, one of which is the minimum height under the load, the other the maximum height empty, there still remains 6 inches of contact between the knuckles. The variation in the minimum and maximum height of draft lines may safely be increased from 3 to $4\frac{1}{2}$ inches, when we yet have remaining $4\frac{1}{2}$ inches contact, when a car of minimum height is coupled to one of the maximum. I think that this will be ample for all purposes in the safe handling of trains.

Inasmuch as it is not necessary for brakemen to go between the cars in coupling, there is no element of danger in the switching yards. All of the railroads are doing their utmost to keep the draft lines within the limits required by law, and yet statistics show that many cars in service today vary much from the requirements, due largely to the conditions mentioned above, and multiplied by the manner of loading and the condition of tracks. I know of no trouble being occasioned by variations of $4\frac{1}{2}$ inches, and believe that automatic bars as constructed today will permit of a safe variation of the amount mentioned above when all cars in service are so equipped.

MR. SCHROYER : I have not said anything in this written discussion as regards the present heights of drawbars or the percentage of drawbars the lines of which are above the maximum limit, or those which are below the minimum. Statistics show that a very large proportion of the cars in service that do exceed the limits are above them rather than below them, and I think this is due to the fact that in raising the cars they had to be raised in certain ways to avoid blocking. I know on the North-Western line it was a general practice that we turned our diamond irons upside down from what the cars were built originally, and in doing that it raised our cars a little higher than we desired to have them. But there was no way to avoid that without great expense in making the change. But those cars which did exceed the height are today below the maximum height, and I think that the large number of cars that are above that height today is due to changes that have been made in that same manner. I know also as regards this matter, we have met this difficulty in getting cars just to the proper height we desired. We furnished drawings to one manufacturing concern, and when the cars were completed the draft line was just right, $34\frac{1}{2}$ inches. We furnished the same drawings to another company, and when the cars were completed the draft line was from $\frac{1}{2}$ to $\frac{3}{4}$ of an inch above what it was on the former lot. We investigated to find out what was the matter, and we found an eighth here and a sixteenth there and a quarter in some other place. They are small amounts which

are difficult to overcome in the construction of a car. In view of the fact that the time is nearly here when these changes will all be effected, I think that something should be done by this Association in the direction of having the limit of draft line increased from 3 inches to about $4\frac{1}{2}$ inches. It might possibly be found that this could be still further increased, but I think that would be probably a safe increase.

MR. RHODES: This is a matter which I believe we ought to proceed with very cautiously and very carefully. It is a matter which I am very glad has come up for discussion, and I think we can spend a little time discussing it. In the first place, when these limits were recommended, I believe that every railroad in recommending to its management, endeavored to get those limits as wide apart as they safely could—I know that for our road we did. We wanted, if possible, to get a variation of 5 inches. We found that would be quite unsafe. We wanted to get a variation, then, of 4 inches. We found that would not do. We wanted, then, to try and get a variation of $3\frac{1}{2}$ inches, and we found that would not do. Finally, our data showed that 3 inches was at the present time the only safe limit that we could give it. The reason for this answer is that if a greater variation than 3 inches is allowed, you will find conditions where you will only have two of the lugs of the knuckle engaging together, and we all know that is not safe. From the data given by the last speaker it might appear that the two lugs would be coupled together. But I think if you will measure the knuckles that are in service, many of them, you will find that it will not permit of that, and that 3 inches is the widest variation that we can have safely now until the links and pins are done away with entirely, and we fill up the knuckle solid. Then we can have greater variation.

I would like to say something on this question of why there is so much variation and why these statistics show that the cars are so far from conforming to what we are trying to do, and to bring that about I would like to read a paragraph from a paper, which I find in the *Daily Railway Age* of June 15. The paper was written by a gentleman for whom we all have the greatest respect, but the statement—while I will not say it is misleading—I do not believe that the situation from which these conclusions have been drawn has been gone into quite fully. This paragraph is as follows:

The suggestion made by some Master Car Builders that the mean height, or an average height between the two ends of a car, shall be taken as the standard, would

not at all obviate the difficulties now presented; on the contrary, the tendency would be to increase both the embarrassments and danger. It cannot be conceived what practical value a standard would be which allowed the average of both ends of the car to be taken as substantial compliance. Certainly, the law had a principal object in view, namely, that when drawbars came together their contact shall be full and complete. This is not accomplished by increasing the range of variation, but rather by an opposite policy. The application of an average would, in some instances, permit an extension of the maximum and minimum limits of opposite drawbars whose variations might so far compensate each other as to bring both within the standard limits, when neither was in reality in compliance with the law. For instance, a car with one drawbar at 31 and the other at 36 inches would, if the average of the two ends were taken, be well within the legal requirements, yet neither drawbar would be at standard, and if of two cars like this the low drawbar of one should be presented to the high drawbar of the other there would be danger in the service both to men and stock. It will be as well to dismiss the idea of averages and continue the practice of making each individual drawbar comply with the legal requirements. By this road only lies reason and safety.

Now, under some conditions I agree entirely with that article, but under other conditions I do not agree with it at all. I asked our worthy Treasurer some time ago what his practice was when he commenced to put his cars to the proper height. He said: "The first thing I did was to take my shop track and see that it was properly leveled and straightened. Then I took a portion of my repair yard and saw that the track was properly surfaced and leveled, and I determined the height of cars on those leveled and surfaced tracks." I asked him: "When these cars that you turned out $34\frac{1}{2}$ inches went through your yards and out on the road, how much would they vary owing to different conditions of the track?" He said: "They would vary all the way up as high as an inch and a half." That corresponds with some practical tests which we made on our line and which have been voiced in some of the clubs. Now, if we take a car turned out of the shop with both ends measuring $34\frac{1}{2}$ inches — and we assume not an inch and a half variation but an inch variation — in some of the yards we will get on one end $35\frac{1}{2}$ inches and we will get on the other end $33\frac{1}{2}$ inches; the total is 69. If you take the average of that you will get the $34\frac{1}{2}$ inches, which is the height at which you turn the car out of the shop on a properly leveled track. Now, the Master Car Builders who advocate the average height as being a more accurate representative of the actual height of a car mean that when the measurement is taken on the average track — not, of course, when there is some abnormal condition of the truck or when it has been clearly shown that the car measures improperly on a properly

surfaced track. I make this explanation in behalf of those who speak about averages—they only speak about the average height as being correct when both ends of the car are measured on average track, with nothing abnormal about either truck.

MR. MORRIS: I noticed that the President referred to this subject, and I move you that the suggestions of the President on this subject be referred to the Executive Committee with instructions to confer with the Interstate Commerce Commission on this matter, and report.

The motion was seconded by Mr. Johnson, and carried.

THE PRESIDENT: If there is no further discussion on this subject we will pass to the next, which is No. 10:

"The best form of support for coal car doors to overcome the difficulties in winter by coal freezing in the cars."

Is there any discussion on this subject? If not, we will proceed to the next, which is No. 11:

"The best method of securing running boards to car roofs, and the proper place for ladders on freight cars; on the side or on the end."

Discussion to be opened by Mr. Mitchell.

MR. MITCHELL: Gentlemen, we all recognize the fact that the running board is one of the most important parts of a freight car, and the running board should be kept in good condition so as to avoid danger to our trainmen. In considering the subject I believe that the following requirements are necessary for good running boards, namely:

1. Smooth or level surface.
2. Properly and securely fastened to the car.
3. Freedom from nails, screws or ends of board projecting above the surface of the running board, which might trip the men running over the car.
4. A running board which will keep in good repair between usual shoppings.

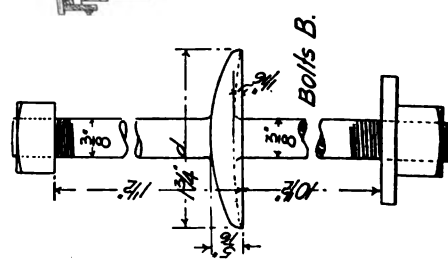
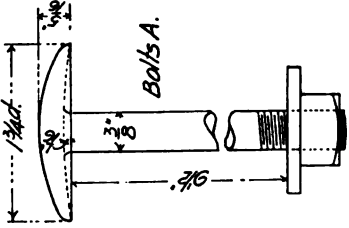
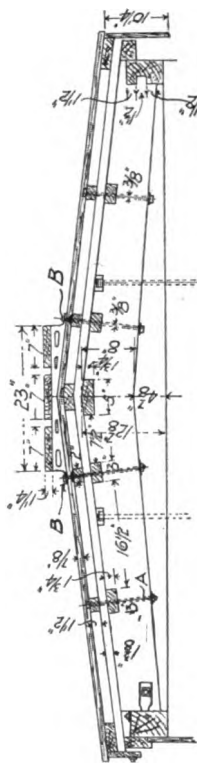
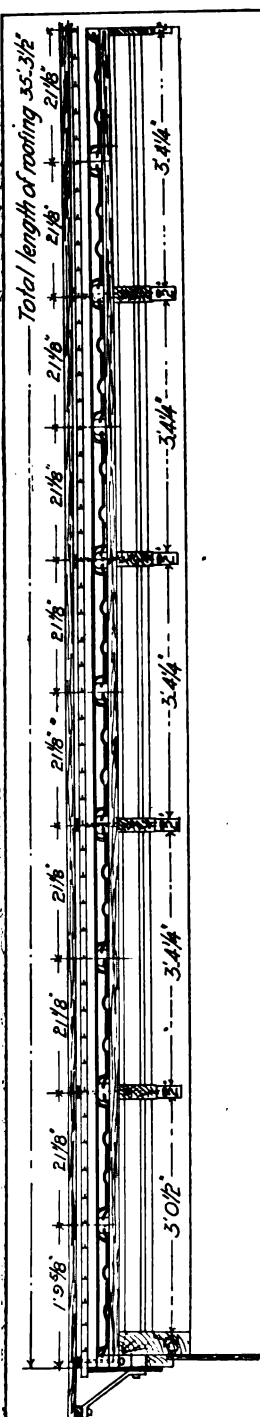
We used to have a great deal of trouble with running boards getting in bad condition, so much so that several of our Superintendents called our attention to the matter and wanted to know if something could not be done to give us good and reliable running boards at all times. So investigations were made, and one of our

men at Buffalo, Mr. Gunn, did get up a running board, which we introduced in 1894 and have put on every car that has been through the shop for general repairs since that time where we could do so, and I present herewith a model of that running board, which you see on the side. We fasten in the running board two malleable iron leveling strips with stud bolts, sinking the heads into the wood the full depth and then screwing on the nut and riveting over the nut. We then fasten it by bolts through the carlins of the car. As a matter of protection, so that our road can use the device, we asked the party who got it up to patent it, and we paid the cost of the patent. It is only a small item, but it is a protection to the Erie Railroad Company. The bracket is in the hands of the Dayton Malleable Iron Company. They sell it at the usual price of malleable iron. So that the patent does not amount to anything except for the protection of the road using it. I have also blue prints, which I will submit, of this running board.

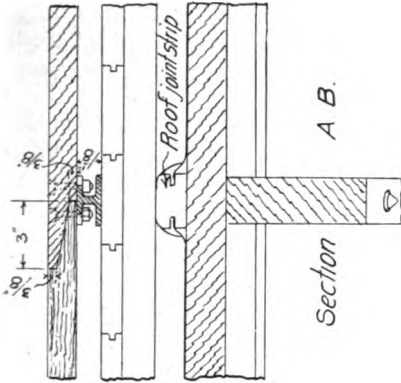
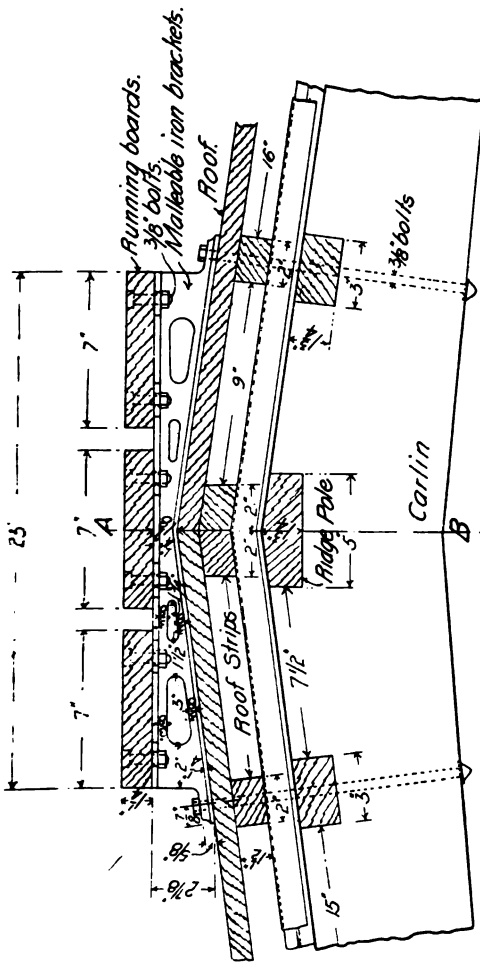
As to the question of ladders, in my judgment the ladder should be so located as to afford the trainmen the greatest protection from injury. Many roads have narrow rights of way—limited space between yard tracks or yard and main tracks; moreover, signal posts between the main tracks, or close to tracks, which would catch a man on a side ladder, whereas an end ladder would render ample protection. Modern cars are built with strong buffing timbers which afford ample protection except in cases of collision or improper handling of the train by the engineer, whereas many trainmen are killed annually by the outside ladder. Hon. Frank M. Baker, who was here yesterday and the day before, the State Railroad Commissioner of New York, said that during last year there were eight cases of trainmen being injured from standing on outside ladders, and the Commission of New York State recommend the end ladder.

MR. RHODES: I would like to ask Mr. Mitchell whether the Commission in making that recommendation advised the end ladder regardless of whether the car has an end platform or not?

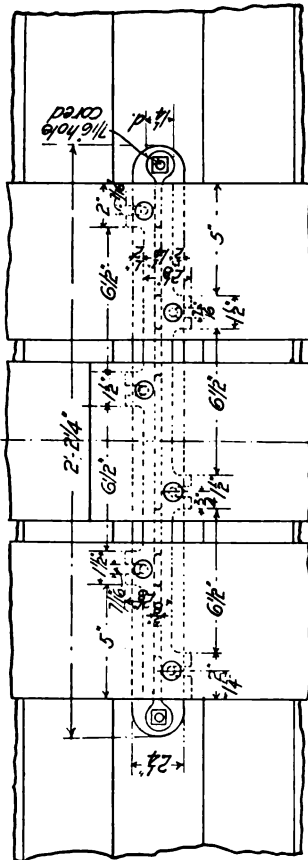
MR. MITCHELL: In answer to Mr. Rhodes I will state that in talking with Mr. Baker on the subject, that if the ladder is on the side there is always a step on the end, he urged the necessity of making a foot-guard on the end step, so that the brakeman in springing on to the end step would not have his foot slip off, and even if the ladder was on the outside on the end of the car and platforms or deadblocks or buffing timbers, he said that in his



ERIE RAILROAD COMPANY.
MODIFICATION TO ROOF OF 60000 LBS.
CAPACITY BOX CAR CLASS Z.
SUSQUEHANNA. 9.10.97.



METHOD OF SECURING THE
 RUNNING BOARDS TO CAR.
 SUSQUEHANNA. Oct. 4 '93.



opinion the man was safer at that point than he would be on the side, and their recommendation would be end ladders in all cases.

MR. SCHROYER : Among our trainmen it is the opinion that the side ladder is safer than the end ladder, for the reason that from the side ladder they can see any obstruction that there may be on the track. Where an end ladder is used on a car that does not have the projecting end sill, there must of necessity be a ladder and a step put on the side of the car to enable them to swing around on the side of the car and get off. The element of danger in a ladder on the end of a car is that in the act of swinging from the end to the side to alight from the car, or to get from the ground on top of the car, if there is an obstruction on the track and they are climbing down the end they cannot see that obstruction at all, and their position is such that they will swing around the side of the car and cannot see anything they come in contact with until they are right there. For that reason our men consider the side ladder safer than the end ladder. Those conditions are changed, however, where there is a projecting end sill on the car, for the reason that there is a platform there on which the men can stand and look around and see if there is an obstruction on the line.

We make our center running board 6 inches wide and $2\frac{1}{4}$ inches thick, and shape it over the roof of the car ; make it stiff and strong, holding it there by $4\frac{1}{2}$ screws, put in quite numerously. The side boards are inch and a quarter thick, and they do very nicely.

THE PRESIDENT : Is there any further discussion on this subject? If not, we will proceed to the next, No. 12 :

" The durability of paint applied to freight cars by compressed air as compared with paint applied by the brush."

Discussion to be opened by Mr. F. W. Brazier.

Mr. Brazier read the following discussion :

Mr. President and Members of the Master Car Builders' Association,—The topic assigned to me to speak on, " The durability of paint applied to freight cars by compressed air, as compared with paint applied by the brush," is a question which our company has taken great interest in. We are at present repainting about four hundred cars per week with compressed air. We are positive that we are getting better results, a saving in labor, and our cars are painted more thorough than with a brush. We have cars that have been painted about two years, and in order to get reliable information for the benefit of this Association, I sent out inquiry letters all over our system to have our foreman painters inspect any and all cars that they could find that were painted with air. I might mention the fact that we found most of the

old-school painters opposed to the air system when we inaugurated it. From one of our Southern States our painter reports as follows :

“ VICKSBURG, MISS.

“ In reply to your letter as to the durability of paint applied by compressed air and the old method by brush, I would state that after making close observation of several cars done by air and by brush, I find but very little difference in them, and if any, it is in favor of cars done with air.

(Signed)

“ J. GLASS, Foreman Painter.”

“ WATER VALLEY, MISS.

“ In answer to your letter I would say that I have given the subject considerable attention, and have compared cars painted by air and the brush, and finished at the same time, and must say that cars painted by air looked equally as well, and show no more signs of giving way than those done by brush ; therefore, think air best on account of cheapness in applying. I must confess that I had no faith in it at first, as I had always been taught that it was necessary to brush paint thoroughly into wood to give it adherence, but am now convinced that air is best.

(Signed)

“ B. J. ROBERTSON.”

Our Master Mechanic at Water Valley says that on examination of cars painted with air within the past two years, “ I find the surface of the cars in better condition than cars painted with brush. The reason for this I attribute to the fact that the spraying of the paint with air fills the cracks of the wood and between joints of siding better than the brush will do, as men are apt to be careless with the brush when painting, and overlook joints in beading.”

(Signed by the M. M.)

“ PADUCAH, KY.

“ Replying to your inquiry concerning the painting of car equipment with air, am of the opinion that the process is one of much value in the expeditious and economical covering of that class of equipment. Better results may possibly be had by a close study of and a changing of the apparatus to do the work to bring about such results, but not to any great extent. To my mind the driving of a pigment against a surface of lumber by air pressure is an advantage in the fact that all portions are covered—beading, slight seams, cracks or any such openings due to the weave of a car in normal condition. My inspection of cars painted by air process has led me to believe that in point of durability the hand process is largely discounted.

(Signed)

“ W. HASMAN, M. M.”

The following letter from our painter in Chicago shows his opinion, and inspection of cars in the West :

“ Replying to your request for my opinion of the wearing qualities of paints applied by air, beg to say that at first I was like a great many others, somewhat skeptical as to the wearing qualities of paint applied by air. Why I should have been so I cannot say. After inspecting work that had been painted six months I felt pretty well satisfied that we need have no fear from the results from this method of painting, and now after inspecting work that has been out nearly two years, I feel perfectly satisfied that work done by compressed air surely will wear as well, if not better than brush work. There is one particular advantage that paint applied by air has over brush work, and that is that it reaches every possible opening, being driven into the open grain of the wood farther, into all cracks, beads, and many places

where it is impossible to get with the brush, thereby more effectually sealing the wood, iron, or whatever you may be painting, to all exposure. Air-applied paint in time becomes very hard, and although it becomes hard it does not get brittle, but seems to retain its life, and does not seem to chalk and perish like ordinary brush-applied oil paint.

"In conclusion I wish to state that I have personally inspected hundreds of cars done by compressed air, and I feel safe in saying that we get far better results from air as far as wearing qualities are concerned. I think that air is desirable from the fact that we get our cars painted with a great saving in labor.

(Signed) "H. G. MACMASTERS, Foreman Painter."

MR. BRAZIER: I went at this very carefully, because I never like to give out anything that I do or have done under me, that is not reliable. You all know that the Illinois Central are using compressed air, more than any other road around Chicago. I feel confident that our work would stand inspection. I took this up in the Southern States and in the Western States, so that we would get the different opinions. I omitted to say that I have the figures with me, which were not called for—the cost of painting a box car with two coats costs us just \$3 a car for a 33-foot car.

MR. SIMONS: We have been painting cars for over two years and we are very much pleased with the results obtained. A few days before leaving home I had my attention called to a car which was painted two years ago last March, and the paint was in an exceptional condition. We find that in cars thus painted the paint fills up all abrasions and cracks, as Mr. Brazier has already said. Our experience has been just about the same as his. We use probably a little different type of machine for doing this work from what a great many others use, and I have figures with me showing the double action of our device. We show it as painting a box car and at the same time throwing paint up on the ventilator of the roundhouse. This is done from one reservoir. I will pass it around among the members.

A MEMBER: I would like to know if it is found satisfactory to use this paint sprayer in the shop.

MR. SIMONS: No, sir; we have not found it satisfactory to use it inside. We do all our work outside.

MR. BRAZIER: I did not quite catch what the last gentleman said, but I want to say that we are painting our passenger trucks in our shop with enamel paint. I understood him to say that it could not be used inside. Our woodwork is done out of doors.

MR. SCHROYER : We have a painting machine. If you are talking about your machines I will talk about mine. We have got one that will throw the paint on the side of the car and under the car and over the car and around both ends at the same time. [Laughter.]

THE PRESIDENT : I think No. 14 has been disposed of. We will proceed to No. 15 :

"The best practice for the proper maintenance of triple valves."

MR. RHODES : Mr. Chairman, I will be very brief on this subject. It will take me only a couple of minutes to say what I wish to say. Section 21 of Rule 3 requires that triple valves and cylinders shall be cleaned and oiled within twelve months, and I believe experience has shown that it is not safe to go much longer than that. With the idea of endeavoring to conform to the wishes of some of our Western friends that triples be cleaned within this time, we started to keep a record. We found that we had 16,800 cars fitted with air brakes, and that to get over those within the time required by the rules we must clean at least 1,400 triple valves and cylinders a month. We had not been keeping any record of that and we did not know what we were doing. As soon as we started to keep a record we found that we were getting over our triple valves within about two and a half years. But as soon as it was found that attention was called to it, then triples began to come in clean. After a little while we found that the work was not very satisfactory. There was more or less trouble with it, and we took our air brake instructor away from his work of instructing his men how to operate the brakes, and we made it his work to instruct the repairers and cleaners how to clean and maintain the brakes, and the revelations that we discovered were simply astounding. I would not like to tell you of the condition that we found things in. Now, in place of telling you how to properly maintain triples, I am going to content myself by saying when you need to do it, do not do it as we did. Start out with your air brake instructor and have him instruct the men how to take care of and maintain and clean the triples, and then keep your record.

THE PRESIDENT : Is there any further discussion on this subject ? If not, the Secretary will make some announcements.

MR. CLOUD : The President has named Messrs. Waughop, Leeds and Van Alstine as a committee to prepare a memorial of Mr. F. J. Ferry.

Mr. Baker, of the New York State Railroad Commission, has been

proposed as an associate member; approved by Mr. Buchanan, Mr. Schroyer, Mr. Bronner and Mr. Chamberlain, to be voted on next year.

THE PRESIDENT: The next report is that of the Committee on Subjects for 1899.

MR. HUMPHREY: Mr. Chairman, in the absence of the chairman of this committee, Mr. Nelson, I beg to submit the following:

SARATOGA SPRINGS, N. Y., June 17, 1898.

MR. CHAIRMAN,—Your committee appointed to report subjects for the 1899 convention begs leave to submit the following list of subjects:

First: Standard specifications for lumber in freight car construction.

Second: Best design of freight car door fasteners.

Third: Standard application of air brake appliances, with a view of reducing the number of couplings in pipes.

Fourth: Best method of applying running boards and ladders to freight cars.

Fifth: Committee to report on the advisability of allowing a differential or fixing prices for repairs done on work west of the 105th meridian.

Sixth: Perfection of top hinged oil box lids, so as to more completely exclude dust from journal boxes.

Seventh: To recommend standard journal boxes $3\frac{3}{4}$ by 7 inches and $4\frac{1}{4}$ by 8 inches adapted to use with the pedestal type of freight car truck.

Eighth: To define length and spread of guard arm, and to consider the devising of a safety limit gauge for determining when M. C. B. couplers and knuckles are worn beyond a limit of safety.

Ninth: To revise the recommended practice of loading poles, logs, bark and other structural material on cars.

Tenth: To report specifications for M. C. B. couplers.

A. L. HUMPHREY,

W. McWOOD,

Committee.

MR. WAITT: I move that the report be received and referred to the Executive Committee.

The motion was carried.

MR. RHODES: Mr. President, I have a recommendation for associate membership:

We do hereby recommend Mr. Clement F. Street for an associate member of the Association.

G. W. RHODES.

J. S. LENTZ.

W. S. MORRIS.

THE PRESIDENT: We are now down to routine and miscellaneous business.

MR. CLOUD: Under this head comes the report of the Committee on Correspondence and Resolutions, which has been handed to me. It is as follows:

Mr. President and Gentlemen:

Your committee recommends the adoption of the following resolutions in recognition of the courtesy and hospitality of those who have contributed to the success and pleasure of the thirty-second annual convention of the Master Car Builders' Association:

Resolved, That the sincere thanks of the Master Car Builders' Association be tendered to the citizens of the village of Saratoga for their courteous hospitality so gracefully proffered by their president, and to him, Hon. H. P. Knapp, for the kindly sentiments expressed in his address to the convention at its opening;

To Bishop Newman, for his devout interposition to Divine Providence in behalf of the Association and its labors;

To Col. Ashley Cole, Railroad Commissioner of the State of New York, for his able and interesting address to the Association;

To the Delaware & Hudson Railroad Co., and its representative, Mr. R. C. Blackall, whose uniform courtesy and liberality have made the meetings at Saratoga so pleasant;

To other railroad companies, to Pullman's Palace Car Co., and Wagner's Palace Car Co., for privileges extended;

To the Supply Men's Association and its various committees, for delightful entertainments provided;

To the *Railway Age*, for its continued successful efforts to provide the convention with a daily summary of proceedings and interesting news.

By the committee.

WM. P. APPLEYARD.

JOHN HICKEY.

W. W. ATTERBURY.

On motion of Mr. Waitt, the report was adopted.

THE PRESIDENT: Has anyone anything to offer under the head of miscellaneous business?

MR. BRAZIER: I for one would like to have a vote of thanks extended to the Arbitration Committee for their arduous duties during the past year, and the faithfulness with which they have attended to their duties. I do not think many of the members are aware of the hard work that committee has to do. While their decisions sometimes do not please us all, they are honest in their decisions. I would make a motion that we extend to the Arbitration Committee a vote of thanks for their arduous labors in the past year.

MR. CLOUD: Would you not include the approval of their decisions?

MR. BRAZIER : Yes, I accept that.

The motion was carried.

MR. CLOUD : We have here some letters in regard to a place for holding the next convention, but there is nothing new in them. They are principally from Niagara Falls and Old Point Comfort, and one from Atlantic City. I do not know whether you care to hear these.

THE PRESIDENT : The next order of business is the election of officers.

MR. CLOUD : The candidates who have been nominated by the regular Nominating Committee are the only nominations thus far received, and those nominations are as follows :

For President, C. A. Schroyer.

For First Vice-President, John T. Chamberlain.

For Second Vice-President, J. J. Hennessey.

For Third Vice-President, W. J. Robertson.

For Executive Committee, E. D. Bronner, J. H. McConnell, William Apps.

For Treasurer, G. W. Demarest.

At the personal request of Mr. E. D. Bronner, he declined the nomination for President.

THE PRESIDENT : Gentlemen, you have heard the nominations.

MR. WAITT : I move that the Secretary be instructed to cast the ballot of the Association for the candidates nominated.

The motion was carried.

MR. CLOUD : The gentlemen whose names have been read are therefore elected to the respective offices.

There were calls for Mr. Schroyer.

MR. SCHROYER : Gentlemen, I had a speech prepared, but I want to say to you in all candor that I forget what it is. But I want to make my bow and thank you heartily and to say that there is no language that I can command that will express to you the thanks that I bear to you today for the honor you have done me in electing me to the position of President of your Association, and I know that if you will do as you have in the past and will indulge me as I know that I shall need to be indulged, I am in hopes that with the efforts which I now propose to put forth that our Association will do as well in the coming year as it has done in the past. It is my intention and desire

to do everything that is in my power to promote the interests of the Master Car Builders' Association. I thank you again for the honor you have conferred upon me. [Applause.] If there is no objection on the part of any of the officers, I would suggest that the Executive Committee meet at 3 o'clock this afternoon in the Secretary's apartments in the hotel, and I hope that all the members of the Executive Committee will make it a point to be there promptly at 3.

MR. MORRIS: As Old Point Comfort has been referred to as a place for holding the next meeting, I wish, on behalf of the Chesapeake & Ohio Railroad, to extend a hearty invitation to this Association. [Applause.]

THE PRESIDENT: I have instructed the Secretary to call out the names of the Executive Committee as it is now constituted, and if they are not all present I wish that you gentlemen would make it a point to advise them of the meeting at 3 o'clock this afternoon.

MR. CLOUD: The Executive Committee will consist, besides the President, of Messrs. Chamberlain, Hennessey, Robertson, Bronner, McConnell, Apps, Demarest, Morris, Higgins and Mendenhall.

MR. WEST: Before adjourning, I move that a vote of thanks be extended to the retiring officers.

The motion was carried.

On motion of Mr. Waitt, the convention adjourned.

REPORT OF THE ARBITRATION COMMITTEE

ON

CASES ARBITRATED SINCE THE LAST CONVENTION AND PROPOSED AMENDMENTS TO THE RULES OF INTERCHANGE.

To the President and Members of the Master Car Builders' Association :

Since the last report to the Association the Arbitration Committee has considered cases from No. 453 to No. 519, inclusive, and it submits herewith copies of these decisions, which have been printed and distributed to the members during the year.

The committee requested the railway clubs and the members of the Association to make suggestions of desirable modifications of the Rules of Interchange, and in reply thereto received a number of communications both from the clubs and from members of the Association, all of which it has considered, and it now suggests that the following changes be made in the Rules of Interchange:

PREFACE.

That the preface be printed in similar type to the rules themselves, but that it should be heavy faced in order to better attract attention; also, that the second paragraph of the preface should read as follows:

"Railroad companies handling cars are responsible for damage done to any car by unfair usage, derailment or accident, and for improper repairs made by them when not chargeable to owner, and they should make proper repairs at their own expense, or issue defect card covering all such damage or improper repairs."

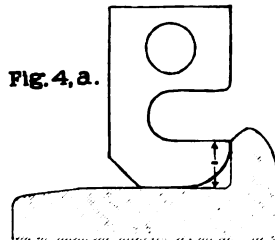
RULE 3.

SECTION 1. First paragraph, second sentence, to read: "They shall be printed in red ink on both sides, and shall be filled in on both sides with ink or black indelible pencil."

In the third line of the second paragraph, add the words "as provided for in Section 28 of Rule 3."

SEC. 2. Omit the words "leaving flat spots deepest at the edge, with a raised center."

SEC. 5. Add to the words in brackets at the end of this section so that it will read "(see Figs. 4 and 4a)," and insert among the figures a new figure (4a), as follows:



METHOD OF GAUGING WORN FLANGES.

SEC. 12. After Section 12 add a new section, which shall come under the marginal heading of "Owners Responsible," and read as follows:

"SEC. . Chipped flange; if chip is on the outside of the flange and exceeds $1\frac{1}{2}$ inches in length and $\frac{1}{2}$ inch in width, or if it extends $\frac{1}{8}$ inch past the center of flange."

SEC. 14. Insert the words "on throat side of flange" between the words "chip" and "exceeds," so that it will read, beginning with the second line, "chipped flange; if chip is on throat side of flange and exceeds $1\frac{1}{2}$ inches in length and $\frac{1}{2}$ inch in width," etc., to the end.

SEC. 15. Change to read, "axles broken or having seamy journals, or with collars broken or worn out under fair usage."

SEC. 16. Introduce the following into the list of limits for axles:

Capacity of Car.	Journal.	Wheel Seat.	Center.
100,000	5 inches.	$6\frac{3}{4}$ inches.	$5\frac{7}{8}$ inches.
80,000	$4\frac{1}{2}$ "	$6\frac{1}{4}$ "	$5\frac{1}{8}$ "

SEC. 17. Change to read, "Cut journals or axles bent or rendered unsafe by unfair usage, derailment or accident."

SEC. 20. Change so that the first sentence will read, "defective, missing or worn-out parts of brakes which have failed under fair usage, except on cars offered in interchange." Make the rest of this section a note following Section 20, to read:

"NOTE.—Air-brake hose and fittings, angle cocks, cut-out cocks, triple valves and pressure-retaining valves cannot be missing under fair usage."

SEC. 22. Omit from this section the words "air-brake hose or fittings or both missing, or," so that the section will read: "If 1-inch hose and fittings are found on $1\frac{1}{4}$ -inch train pipe."

SEC. 29. Omit this section entirely.

SEC. 34. Add to the list of exceptions provided at the end of first paragraph, "Section 22," so that the last part of this paragraph will read, "with the exception of the cases provided for in Sections 22, 29, 30, 31, 32 and 33 of Rule 3."

Note.—If Sec. 29 is omitted, as recommended, it will be omitted in this enumeration.

Omit from the last paragraph of Section 34 the words "and shall pass the car back to the owning road if it is safe to run," with which this paragraph ends.

Change the heading at the top of page 14 of the rules of 1897 so that it will read:

"Combination of defects which denote rough usage, if caused at one and the same time and at the same end of car."

SECTIONS 35 to 41, inclusive. Strike out the words "drawbar springs" wherever they occur in these sections; and in the case of couplers, drawbars, drawbar pockets, spindles and end sills, it is recommended to state these parts in the singular instead of plural number, for the reason that there is only one of each on one end of a car.

SEC. 43. Add a note after this section, as follows:

"NOTE.—The word 'coupler' in the above sections Nos. 35 to 43, inclusive, means the coupler body or knuckle."

RULE 4.

SEC. 5. Change the second paragraph to read :

"When M. C. B. couplers, knuckles, metal brake beams, wheels or axles are replaced under conditions which make them chargeable to the owner it must be plainly stated on the repair card and stub whether the material is new or secondhand. Metal brake beams of any make may be used in renewal, provided they fit hangers and connections standard to the car."

SEC. 6. Change this section to read :

"In replacing link and pin drawbars, cast-iron, wrought, malleable iron or steel drawbars, having either a pocket or spindle attachment, may be used when of sufficient strength and fitting properly."

SEC. 7. Make the second sentence of this section read as follows :

"Cars should be adjusted in height when empty, as far as possible, and in order to justify a bill for this work under the Rules of Interchange, an empty car measuring $32\frac{1}{2}$ inches or less should be adjusted to $34\frac{1}{2}$ inches," etc., to the end as now.

SEC. 14. Omit this section from the rules.

SEC. 15. Change the last sentence of the third paragraph to read :

"The card shall be printed on both sides in blank ink, and shall be filled in on both sides with ink or black indelible pencil, and be of the following form :

"The cards and stubs must state whether new or secondhand material is used, and whether solid or filled journal bearings are applied and removed."

RULE 5.

SEC. 3. Subdivide this section, modify and add to it so that it will read as follows:

"SEC. 3. When improper repairs of owner's defects have been made and bill rendered, the owner may counter-bill against the company making the wrong repairs for the cost of changing the car to the original standard, or to the requirements of Rule 4, if the work is done.

"SEC. 3A. When improper repairs of defects for which owners are not responsible are made, the owner may counter-bill against the company making the repairs for the cost of changing the car to the original standard, or to the requirements of Rule 4, if the work is done. The joint evidence of two persons, one representing the owner of the car and the other representing the delivering road, that the repairs are not proper shall be final.

"SEC. 3B. A joint evidence card shall be used for this purpose, which shall be in the following form :

parts of the coupler to be charged at the rate of 3 cents per pound, the parts of such couplers removed to be credited at scrap rates."

SEC. 12. Make this section read as follows :

"When M. C. B. couplers, knuckles or metal brake beams are replaced, good secondhand material may be used, but in this case the charge and the credit shall be 75 per cent of the price when new. When replacement prices are quoted, 75 per cent of such replacement price should be used in billing when secondhand couplers and knuckles are used."

SEC. 17. Make the last paragraph of the note at the end of this section, at the bottom of page 28, read as follows :

"No charge to be made for the labor of replacing or applying M. C. B. knuckles, knuckle pins, locking pins, clevises or brake shoe keys."

SEC. 23. Change this section to read as follows :

"Switching roads cannot render bills direct against the owners of cars for repairs made, except for repairs to roof lost on account of decay or faulty construction, broken truck springs, truck transoms, arch bars, column bolts, truck hangers, truck transom truss rods, truck bolsters, truck bolster truss rods, oil boxes, spring planks and truck hanger pins, providing the damage has not been caused by derailment or rough usage, and with the exception of these defects will be held responsible for all new defects which may have been caused while the cars are in their possession.

"It is not the intention to prevent switching roads from rendering bills against their immediate connections for any repairs of car owner's defects which may be authorized by such connections when delivering the cars, and which existed upon the cars at the time of delivery. In such cases the delivering road must pay the bills of the switching road and can only recover from the car owners by certification, on bills rendered by the delivering line against the owners of car, that the car owner defects existed before the cars were delivered to the switching road.

"A switching road is a corporation doing the major part of its business on a switching charge, or one which does not pay mileage for handling cars."

RULE 6.

SECTION 3. Change to read as to the point of delivery of trucks returned from cars destroyed as follows :

"Free of freight or other charges to the nearest point on the line of the company owning and operating the car," etc., to the end.

MINUTES OF MEETING HELD IN CHICAGO, ILL., JULY 20, 1897.

Members Present: G. W. Rhodes, Chairman; M. M. Martin, G. L. Potter,
J. N. Barr.

Mr. Mackenzie not being present at the meeting, subsequently concurred in these decisions.

Resolved, First: That no hypothetical cases will be considered.
Second: That all cases will be decided under the rules in force at the date of the card.

NOTICE.

Attention is called to the provision of Rule 11 of the Revised Rules of Interchange, taking effect September 1, proximo, for the submission of cases in dispute to the Arbitration Committee, which is as follows:

In case of any dispute or question arising under the rules between the subscribers to said rules, the same may be submitted to this committee through the Secretary, in abstract jointly, said abstract setting forth the point or points at issue and each party's interpretation of the rules upon which its claim is based, clearly and concisely, not exceeding three typewritten pages of letter size, single space, which shall be signed by both parties to the dispute.

The committee desires to have it understood that all cases sent to the Secretary for the consideration of the Arbitration Committee after August 31, shall be submitted in accordance with the provisions of the new Rules of Interchange, whether the dispute has arisen under the Revised Rules of Interchange or under some old rules.

ARBITRATION CASE No. 453.
NEW YORK, CHICAGO & ST. LOUIS RAILROAD COMPANY

versus

CHICAGO & NORTH-WESTERN RAILWAY COMPANY.

WRONG DOOR BILLED BY OWNER AGAINST DELIVERING ROAD.

The Chicago & North-Western Railway Company rendered bill against the New York, Chicago & St. Louis Railway Company for repairs to cars during the months of October, November and December, 1896, based on defect cards with one exception, namely, one side door applied to C. & N.-W. R'y car 29400, amount \$3.50, less credits for cast and wrought scrap. As justification for this charge the bill was accompanied by a joint evidence card signed by the inspectors of the C. & N.-W. R'y and N. Y. C. & St. L. R. R. at Chicago, stating that this car was received by the C. & N.-W. R'y from the N. Y. C. & St. L. R. R. on December 10, 1896, with the following improper repairs: "One wrong side door; two wrong door shoes and two wrong hangers."

The N. Y. C. & St. L. R. R. Co. objected to this charge against car 29400, stating that it made no repairs to the car, and it has no knowledge of the wrong repairs; it thinks that the C. & N.-W. R'y should look to the parties making the repairs.

The C. & N.-W. R'y Co. replied that there was no repair card on the car to indicate where the repairs were made, and inasmuch as it had received the car from the N. Y. C. & St. L. R. R. with these wrong repairs and with the joint evidence statement it believes the N. Y. C. & St. L. R. R. Co. should pay the bill. In later correspondence the C. & N.-W. R'y Co. referred to Arbitration Case 394 as a parallel case, and the N. Y. C. & St. L. R. R. Co. replied that the decision in this case is not retroactive, and therefore the correctness of the bill cannot be judged by the action of the committee several months after the case occurred.

Further correspondence failing to settle the matter, it is referred, by mutual consent, to the Arbitration Committee for decision.

DECISION.

This case involves repairs which if properly made are chargeable to the owner, and if improperly made and charged can be counter-billed. The M. C. B. Rules of Interchange furnish full protection to the car owner in cases of this kind by providing that the joint evidence of the car owner and the delivering road shall be final as to the facts in the case. Such joint evidence authorizes the car owner to make a rebuttal bill in case bill has been passed. The road making the wrong repairs is the only one of the parties to the transaction that suffers any loss.

It is claimed that under Arbitration Case No. 394 the New York, Chicago & St. Louis Railroad Company should pay for making proper repairs in this case. Decision No. 394 covers a case in which the owner is not chargeable for the repairs, the damage covering items which must be repaired at the expense of the parties causing the same. The decision requires in such cases that roads intermediate between the ones causing the damage and the owner shall see that the owner is properly protected against the evident wrong repairs by procuring a defect card on

receiving the car, or furnishing its own defect card on demand, which can be used in case any bill is presented against the Chicago & North-Western Railway Company. There is no evidence submitted that such a bill has been presented.

In the opinion of the committee, the bill of the Chicago & North-Western Railway Company should be withdrawn until a bill is presented for the wrong door and fastenings.

NOTE.—*Mr. Mackenzie being interested in this case, was not a party to the decision.*

ARBITRATION CASE No. 454.

FORT WORTH & DENVER CITY RAILWAY COMPANY

versus

UNION PACIFIC, DENVER & GULF RAILWAY COMPANY.

TRAIN BROKE IN TWO AND RAN TOGETHER. ROUGH USAGE.

On February 14, 1897, four Fort Worth & Denver City Railway Company cars were damaged by train parting and running together on the line of the Union Pacific, Denver & Gulf Railway Company. The cars were taken to Texline, a junction point of the two roads, for repairs, and an examination by the inspectors of both roads disclosed the following defects :

Car 685.—One draft timber split and one deadwood damaged ; one inside coil of drawbar spring and one follower plate gone ; one draft timber, two strap bolts, four carry irons and one lug bolt broken and one carry iron gone.

Car 605.—One draft timber end and one deadwood slightly damaged ; one brake beam, four carry iron bolts and one lug bolt broken, and one brake hanger gone.

Car 378.—One deadwood slightly damaged, two draft timbers broken ; two lugs, three lug bolts, two strap bolts and four carry iron bolts broken.

Car 833.—One center sill split ; one draft timber end broken ; one deadwood broken ; one lug, three bolts, one strap, one strap bolt, four carry iron bolts, seven draft bolts, and one end of one body truss rod broken ; nut and washer gone.

The F. W. & D. C. R'y Co. demanded defect cards for the above damage on the ground of unfair usage, but the U. P. D. & G. R'y Co. refused to issue the cards, claiming that Section 48, Rule 3, expressly states that certain combinations of defects shall be considered as indicative of unfair usage, and unless these combinations exist the defects cannot be charged to the delivering company, but are owner's defects ; that if the train parted, it was more than likely on account of the poor condition of the draft gear, which is covered by Section 48, Rule 3.

The F. W. & D. C. R'y Co. argues that Section 48, Rule 3, has no bearing whatever on this case ; that the fact that train parted and ran together, causing this damage, is undoubted evidence of unfair usage, and should be covered by defect card.

Further correspondence failing to settle the matter, it is referred, by mutual consent, to the Arbitration Committee for decision.

DECISION.

It is admitted in this correspondence that the train parted and ran together again, causing this damage. This was an accident, and in accordance with the second paragraph of the Preface to the Code of Rules the company handling the car is responsible for the damage done. In the opinion of the committee, the Union Pacific, Denver & Gulf Railway Company should have issued defect cards at the request of the Fort Worth & Denver City Railway Company covering the damage.

ARBITRATION CASE NO. 455.

PHILADELPHIA, WILMINGTON & BALTIMORE RAILROAD COMPANY

versus

LEHIGH VALLEY RAILROAD COMPANY.

DRAWHEAD SHORT, BUT WASHERED OUT TO PROPER LENGTH.

On November 30, 1896, the Philadelphia, Wilmington & Baltimore Railroad Company rendered bill against the Lehigh Valley Railroad Company for work done on L. V. R. R. cars, in November, 1896, including therein a charge against L. V. car 33750, as follows:

Labor, 2 hours, .40; one P. R. R. drawbar, 72 lbs., \$2.16; one tail bolt, 14 lbs., .42; three draft washers, 6 lbs., .18; total. \$3.16

Cr.

Wrought scrap, .15; cast scrap, .3651

Net amount of bill. \$2.65

The bill was returned by the L. V. R. R. Co. calling attention to certain credits which it did not consider correct, and also to this charge against car 33750, and claiming that the drawhead was 18 inches long instead of 20 inches long, and too light, weighing but 75 pounds, while the drawbar standard to the car weighed 110 pounds, asking for a defect card to cover

The P. W. & B. R. R. Co. corrected the credit items referred to, with the exception of the matter pertaining to car 33750, which it considered as right as first rendered, as the wrought-iron drawbar was $2\frac{1}{2}$ inches shorter over all than the L. V. cast drawbar, but that it had used a ferrule to make up the difference in the length of the shank, and as the bar fitted properly otherwise, and was doubtless as strong as the cast-iron bar, it wished to know if the L. V. R. R. Co. meant to object to the use of the ferrule to fill out the length.

The L. V. R. R. Co. replied that when the car was received upon its road with such a drawbar, the drawbar was removed and scrapped, and it does not believe that the use of a ferrule is consistent with the rules, and that, therefore, the drawbar used does not properly fit.

Further correspondence failing to settle the matter, it is referred, by mutual consent, to the Arbitration Committee for decision.

DECISION.

The question involved in this case is whether a spindle drawbar $2\frac{1}{4}$ inches shorter than the standard for the car, but ferruled or washered out to the standard length, should be regarded as proper repairs.

In the opinion of the committee, a link-pin drawbar washered out to the proper length, as in this case, should pass, and the bill of the Philadelphia, Wilmington & Baltimore Railroad Company is correct, and should be paid.

ARBITRATION CASE No. 456.

PEORIA & PEKIN UNION RAILWAY COMPANY

versus

CHICAGO, ROCK ISLAND & PACIFIC RAILWAY COMPANY.

PEORIA & PEKIN UNION NOT A SWITCHING ROAD:

In January, 1897, the Peoria & Pekin Union Railway Company rendered bill against the Chicago, Rock Island & Pacific Railway Company for repairs to five C. R. I. & P. cars during the month of December, 1896, total amount of bill, \$16.31, accompanying the bill with proper repair card stubs.

Also, in February, 1897, the P. & P. U. R'y Co. rendered bill against the C. R. I. & P. R'y Co. for repairs to four C. R. I. & P. cars in January, and attached to the bill repair card stubs properly filled out for these charges — total amount of bill, \$6.24.

The C. R. I. & P. R'y Co. returned the bills, stating that they were supported by M. C. B. repair card stubs, but that the P. & P. U. R'y Co. paid no mileage and, under the rules, was a switching road, and that the bills should be canceled.

The P. & P. U. R'y Co. replied that it pays mileage on all foreign cars handled over its main track, and sent a copy of a general circular dated December 20, 1896, calling attention to the fact that the P. & P. U. R'y Co. is paying mileage on all foreign cars handled over its main tracks, the mileage payments beginning December 1, 1896, and that it is not a switching road in any sense; that all other companies pay its bills for repairs of this kind, and it expects the C. R. I. & P. R'y Co. to do likewise.

Further correspondence failing to settle the matter, it is referred to the Arbitration Committee, by mutual consent, for decision, by the P. & P. U. R'y Co., and in making this reference that company states that it owns and operates about twenty miles of main-line track; that the major part of its business is not done on a switching charge; that it pays mileage on foreign cars and did pay mileage during the months of December, 1896, and January, 1897; that it owns 250 cars, and it delivers more of these cars every month to the C. R. I. & P. R'y than it received C. R. I. & P. cars from it; that the C. R. I. & P. R'y Co. has broken more of its cars than it has of the C. R. I. & P. cars, and that the P. & P. U. R'y Co. has paid the C. R. I. & P. R'y Co. bills promptly; that it has worked under the rules since the organization of the New Interchange Association, or the Chicago Agreement, and was one of the roads to join this association a short time after its organization, and remained in it all the time during its existence; that during this time none of its bills were disputed on this ground; that all the roads dealing directly with it treated it as a regular railroad, and not as a switching road. It also sends a copy of its time-table.

DECISION.

Paragraph 1 of Leaflet No. 3, dated December 16, 1896, describes a switching road as follows :

"A switching road is a corporation doing the major part of its business on a switching charge, or one which does not pay mileage to car owners for the use of the owner's car."

The Peoria & Pekin Union Railway Company has paid mileage on foreign cars since December 1, 1896.

In the opinion of the committee, the bills of the Peoria & Pekin Union Railway Company are correct and should be paid.

ARBITRATION CASE NO. 457.
CHICAGO & WEST MICHIGAN RAILWAY
versus
ANN ARBOR RAILROAD.

CARS DAMAGED BY SWITCHING. NOT ROUGH USAGE UNDER THE RULES.

On September 19, 1896, the Chicago & West Michigan Railway rendered bill against the Ann Arbor Railroad for repairs done on September 11, to C. & W. M. R'y cars 1970 and 516 at Thompsonville, on account of damage done by the A. A. R. R., replacing one Gould knuckle in car 1970, net charge \$2.53; and one follower plate and one shank pin and two hours' labor on car 516; net charge, \$1.30; total amount of bill, \$3.83.

The bill was returned by the A. A. R. R., asking upon what authority it is rendered, as both cars are C. & W. M. cars, and knuckles and follower plates are defects for which owners are responsible under the M. C. B. Rules in effect September 1, 1896. The C. & W. M. R'y replied that the damage was done by the Ann Arbor trainmen making a drop of C. & W. M. car 516 against another train; that the speed at which the drop was made was so great that when it struck C. & W. M. car 1970 the blow was severe enough to break the knuckle in car 1970, and the follower plate and shank pin in car 516.

The A. A. R. R. replied that this claim of unfair usage will not justify the charge, as the rules define what is rough usage; that the broken knuckle on car 1970 and the broken follower plate on car 516 neither one comes under the classification of rough usage, as they were on different cars, and it would not have been rough usage had they been on the same car, and therefore declines to pay the bill.

The C. & W. M. R'y calls attention to the fact that the correspondence shows from the inspector at that point, that the one car was dropped against the other without applying the brake and that the damage was done by the violence of the shock; that this is testified to by the joint agent of the two roads at Thompsonville, who advises that the A. A. R. R. should card for the defects.

Failing to settle the matter between them, it is referred, by mutual consent, to the Arbitration Committee for decision.

DECISION.

There is no evidence of wreck or derailment submitted. The damage occurred in switching cars. The several paragraphs of the "Note" at the end of Sections 40

and 48 of Rule 3, define combination damages which when they occur on any one car shall be regarded as constituting unfair usage. The damage to the cars in question is not such as is defined as unfair usage.

In the opinion of the Arbitration Committee, the bill of the Chicago & West Michigan Railway is not correct and should be canceled.

ARBITRATION CASE No. 458.

NELSON MORRIS & Co.

versus

LAKE SHORE & MICHIGAN SOUTHERN RAILWAY COMPANY.

HOSE "DAMAGED BY STRIKING" CHARGED TO CAR OWNER.

In November, 1896, the Lake Shore & Michigan Southern Railway Company rendered bill against Nelson Morris & Co. for applying one air hose to the latter company's car 6619, the repair card stub attached to the bill giving as a reason for applying the hose, "hose cut by striking."

Nelson Morris & Co. returned the bill, objecting to payment, stating that while it is perfectly willing to pay bills for air hose replaced on account of having been bursted, worn out or leaky, it objects to being charged for air hose "cut by striking"; that it is impossible to cut an air hose except by unfair usage, and that no manufacturer will replace air hose rendered useless in this manner, because it cannot be considered as fair usage.

The L. S. & M. S. R'y Co. replies that it believes that air hose is cut by ordinary service, the same as car couplers are broken, and the rule which establishes this fact is based on the ground that the couplers break in ordinary service; that air hose is cut by striking in the same manner that couplers are broken, namely, by two cars coming together, the hose being cut when the drawbar on one car passes the drawbar on the other, allowing some part of the end of the car to strike the hose. In regard to the manufacturers' guarantee, it does not think that the same construction is placed on the term "ordinary service" by the manufacturers, and upon which they base their guarantee, as is placed by the M. C. B. Rules, not only on air hose, but all parts of cars; it still believes its position in this case is correct, as the car was not in a wreck, nor did it receive any rough usage, the hose being the only part renewed, as shown by the stub attached to the bill.

To this Nelson Morris & Co. replied that it also believes the damage was done by two cars coming together, the drawbars passing each other, but that this will happen only when switching on curves, throwing the cars violently together; that the guard arm of one coupler will strike the face of the closed knuckle in the other coupler at an angle, and if the blow is sufficiently severe, it will cause the guard arm to slip off the face of the knuckle, strike the inner face of the other coupler, driving it back, and allowing knuckle to strike hose on opposite car; that this is a rare occurrence, and will happen only when cars are roughly handled while being switched on a curve; that the condition of the track causing one car to lean one way and the next car the other way, also has a tendency to promote couplers passing each other if the cars are roughly handled; that the location of train pipe, angle cock and air hose

as laid out by the M. C. B. Association is such as to make it impossible to damage the parts by fair usage.

Further correspondence failing to settle the dispute, it is referred, by mutual consent, to the Arbitration Committee for decision.

DECISION.

Hose is frequently rendered useless by being struck. There is nothing in this case to show that the striking of the hose was caused by unfair usage. In the opinion of the committee, the bill of the Lake Shore & Michigan Southern Railway Company is correct, and should be paid.

ARBITRATION CASE No. 459.

AMERICAN REFRIGERATOR TRANSIT COMPANY

versus

MISSOURI PACIFIC RAILWAY COMPANY.

REFRIGERATOR CAR DAMAGED BY FIRE INSIDE.

American Refrigerator Transit Company car 7056 was delivered home at St. Louis, by the Missouri Pacific Railway Company, on January 4, 1896, and a demand was made by the owners for a defect card for 20 boards lining, 25 boards ceiling, and 12 beef rack bars damaged by fire.

The record of the movement of the car showed that it left St. Louis, loaded, December 19, 1895, over the M. P. R'y, when it was in good condition. The M. P. R'y Co. received the car from the Texas & Pacific Railway on January 1, empty, and moved it direct to St. Louis, where it was delivered to the owners on January 4; it declined to give the defect card requested by the A. R. T. Co. because a very careful investigation, made at the different inspecting stations, and statements of conductors handling the trains in which the car moved to St. Louis, showed conclusively that the damage did not occur while on that line. It states that it is not customary for inspectors to inspect the interior of cars, and believes that it is the custom for private lines to take up the settlement of damage to interior of their cars (which comes under the classification of concealed defects) with the railroad company or company last loading the car.

The A. R. T. Co. claims that it should have defect card from the M. P. R'y Co. because the damage was of very recent date when the car arrived at St. Louis, and it considers it a great injustice that the A. R. T. Co. should stand any such damage; that the matter had been thoroughly investigated over the T. & P. R'y the same as over the M. P. R'y, and no one handling the car knew of any damage occurring to it while on that line.

The M. P. R'y Co. replied that if the damage had occurred on its line it would be ready and willing to furnish defect card for the same, but it did not occur on that line, and the defects were hidden defects when the car passed over it, so that the inspectors could not see them and demand a defect card when received; it states further, that the nature of the damage would indicate that it was caused while the car was loaded, and as it did not exist upon the car when it was unloaded after its trip south over the M. P. R'y it must have had another load in it and been damaged

before its return over the M. P. R'y when the car was empty; it considers that it has shown absolutely that the damage did not occur while the car was in its possession.

Further correspondence failing to settle the matter, it is referred, by mutual consent, to the Arbitration Committee for decision.

DECISION.

Rule 7 of 1895 reads as follows: "Locks, grain doors and inside parts of cars are at owner's risk, except where damaged by wreck or unfair usage." It is clearly shown by detailed inquiry that there was no unfair usage or wreck of this car on the Missouri Pacific Railway, and in the opinion of the committee the American Refrigerator Transit Company has no claim against the Missouri Pacific Railway Company for this damage.

ARBITRATION CASE NO. 460.
ALABAMA GREAT SOUTHERN RAILROAD
versus
MOBILE & OHIO RAILROAD COMPANY.

FILLED SHELL BEARINGS NOT WRONG REPAIRS.

In January, 1897, the Mobile & Ohio Railroad Company rendered bill against the Alabama Great Southern Railroad for repairs to cars, original amount, \$2.82, accompanying same by repair card stubs showing the reasons for the repairs and repairs which were made.

The A. G. S. road returned the bill, stating that the prices for brasses against cars 6100, 6055 are for filled shell bearings; that its cars are not equipped with this kind of journal bearings, and if brasses of this kind were put in, it should have authority to bill against the M. & O. R. R. Co. for wrong repairs.

The M. & O. R. R. Co. replied that it was authorized to use M. C. B. standard material provided it is of proper dimensions, as provided in Section 5, Rule 4, M. C. B. Rules, and it believes that no card for wrong material is due.

The A. G. S. R. R. again returned the bill for correction, stating that that company did not use the filled shell brass, consequently the brasses removed were solid brasses and should be credited at 8 cents per pound instead of 5 cents, as in the bill; that it still believes it is entitled to a defect card for wrong repairs, and it does not find that the M. C. B. Association has ever adopted filled shell bearings as a standard, and it does not believe the rules permit the application of filled bearings to cars equipped with solid bearings.

The M. & O. R. R. Co. finally agreed to give credit for the scrap removed at 8 cents per pound, and bill was corrected so that the net amount was \$2.47 instead of \$2.82, but declines to issue defect card for wrong materials.

After further correspondence upon this subject, it is referred to the Arbitration Committee to determine whether, under the circumstances, the A. G. S. R. R. is entitled to a defect card for wrong materials used in applying filled bearings to these cars instead of solid brasses.

DECISION.

The Rules of Interchange provide a rate to be charged for filled shell bearings, and as the use of such bearings is considered good practice by some railroad

companies, it is the opinion of the committee that their employment in this case cannot be considered as improper repairs, and therefore, that no defect card need be issued.

ARBITRATION CASE No. 461.

UNION PACIFIC SYSTEM

versus

MISSOURI PACIFIC RAILWAY COMPANY.

POINT OF DELIVERY OF PARTS FOR REPAIRS OF CARS.

On January 5, 1897, the receivers of the Union Pacific System rendered bill, amount \$1.14, against the Missouri Pacific Railway Company for freight charges paid by the former company on shipment from St. Louis to Omaha, via M. P. R'y, on castings ordered for repairs of St. L. I. M. & S. car 11909.

The bill was returned by the M. P. R'y Co. with the request that it be canceled, as under the M. C. B. Rules the St. L. I. M. & S. R'y should deliver these castings at St. Louis, the northern terminus of its line.

To this the U. P. R'y replies that the claim of the M. P. R'y Co. is a mere technicality; that it made no request on the St. L. I. M. & S. R'y for this material and does not know that road in the transaction; that the material was ordered from the M. P. R'y Co. and was furnished and billed by it, and could just as well have been furnished from the Omaha shops as to have delegated the matter to the De Soto shops. It further claims that the Arbitration Committee's decision in Case 329 is that the St. L. I. M. & S. R'y is a division of the M. P. System, and the road is not known in its individual capacity, and says, if the M. P. R'y Co. could not have furnished the material ordered, it should have given notice to that effect, so that requisition could have been made on the proper party.

The M. P. R'y Co. replies that the M. C. B. Rules provide that companies shall promptly furnish to each other upon request, and forward free over its own road, material for repairs to its cars injured upon foreign lines that cannot be procured in the open market, etc.; that the material in this case was for repairs of St. L. I. M. & S. R'y car 11909, and the M. P. R'y Co., which does not own this car, should be paid for transporting the material from St. Louis, the nearest point on the line of the St. L. I. M. & S. R'y to the U. P. R'y. It says that Arbitration Case 329 does not apply in this case, as the decision was based entirely on erroneous information obtained from the Travelers' Official Railway Guide; that the St. L. I. M. & S. R'y is not a branch of the M. P. R'y, but is simply a controlled road, and bears exactly the same relations to the M. P. R'y that the P. W. & B. R. R. does to the Penna. R. R. Co.; that its equipment is not included with the M. P. R'y, but is shown separately in the Official Railway Equipment Register, and the road is operated under the supervision of a different General Superintendent; that Cases 372 and 405 obtain in this case, and it therefore declines to accept the bill.

The U. P. R'y replies that it cannot change its opinion in the matter, as Arbitration Case 329 decides that the St. L. I. M. & S. R'y is a part of the M. P. R'y, and

until that ruling has been reversed it must handle its charges in accordance with the same.

Further correspondence failing to settle the matter, it is referred, by mutual consent, to the Arbitration Committee for decision.

DECISION.

The Missouri Pacific Railway Company received the order from the Union Pacific Railway Company for the material in question and had the order filled. This it should not have done unless for repairs of its cars, in which case it should transport the material free of freight charges over its line. It is the opinion of the committee that the bill of the Union Pacific Railway Company for these freight charges should be paid.

ARBITRATION CASE No. 462.

FORT WORTH & DENVER CITY RAILWAY COMPANY

versus

UNION PACIFIC, DENVER & GULF RAILWAY COMPANY.

TRUCKS RETURNED, BUT NOT IN GOOD ORDER.

On December 4, 1896, Fort Worth & Denver City Railway car 1607 was destroyed on the line of the Union Pacific, Denver & Gulf Railway, and it elected to return the trucks. Upon receipt of the trucks by the Ft. W. & D. C. R'y an inspection was made and the following defects were found, to cover which a request for defect card was made :

One sand board, undersize ; 1 axle, undersize ; 2 bolster truss rods, undersize ; 2 foreign center plates ; 2 truck columns, broken ; 4 worn-out brasses, and 1 oil-box wedge, broken.

After a good deal of correspondence the U. P. D. & G. R'y agreed to give card to cover the last three items, namely, truck columns, brasses and oil-box wedge, but it declined to give card for the other defects for the following reasons :

It says that it reapplied the sand board originally in the truck, and it having been in the truck for some time had shrunken to its present size, having been of proper size when first applied ; that it does not understand the M. C. B. Rules, although they state that trucks are to be delivered in good order, to mean that the delivering company should renew timbers which have shrunken in service and become less than the original size.

Similarly, it reapplied the center plates which were originally in the car, and if they are wrong to the car they must have been put in by the owner, as it made no repairs to the car other than those necessary on account of this damage, from the time the car was received from the owner until the trucks were delivered back to that company.

As to the axle, its record shows that it was of proper size, and it has no record of the truss rods being undersize.

It further states that the Ft. W. & D. C. R'y cars have been sadly lacking in any standard for material, it being a common thing to see not only mixed center plates and mixed drawheads, but also mixed brakes under the same car ; that this

condition of affairs came about through the road having been operated as a part of the Union Pacific System, and its castings authorized to be applied to Ft. W. & D. C. R'y cars whenever repairs were necessary; that Ft. W. & D. C. R'y cars are being received every day from that company, with U. P. R'y castings which are not according to the original construction, and no exception is made to their delivery or receipt back again.

The Ft. W. & D. C. R'y claims that inasmuch as the U. P. D. & G. R'y Co. decided to return the trucks, that it obligated itself to return them in good order and according to their original construction, and refers to Arbitration Cases 49, 59, 77, 86, 195, 227, 248 and 347. It further states that it allowed the U. P. D. & G. R'y Co. \$200 for these trucks, which is their value new, according to the M. C. B. Rules, and that when this money is allowed the trucks should be returned in good order and according to their original construction. It states in regard to the claim that it has cars in service carrying foreign material, that there is some foreign material on its cars placed there while the road was a part of the Union Pacific System, by that road, but without the authority of the Ft. W. & D. C. R'y.

The disputants failing to settle the matter by correspondence, have mutually agreed to refer the matter to the Arbitration Committee for decision.

DECISION.

In the Arbitration cases quoted by the Fort Worth & Denver City Railway the decisions are as follows:

Case No. 49, October, 1890. "Owner is justified in making changes necessary to restore trucks to their original standard. The claim that foreign parts were in the trucks at the time the car was destroyed is not a good defense. A bill rendered for the renewal of the wrong parts and the cost of correcting bad workmanship is just and in conformity with the rules. The committee cannot sustain the claim made for wheels, for the reason that while they were not the same as originally used in the trucks, those returned were not worn out."

Case No. 59, December, 1890. "The party repairing and returning truck is just as much responsible for the substitution of the proper axle in this truck as though it had placed the wrong axle in the truck."

Case No. 87, May, 1891. Same as No. 59.

Case No. 86, May, 1891. "Rules do not require inspection of the material returned at any intermediate point. The committee must also accept the statement of the road to which the material was shipped."

Cases No. 195, 227 and 248 have no bearing on the subject in dispute.

Case No. 347, January 27, 1895. "Wrong repairs. Trucks must be repaired to the satisfaction of the owner."

In the case under consideration, card is claimed for one sand board, undersized, but it is admitted that it is the same that was in the truck originally. Claim for card for this defect is not allowed.

In the case of one axle undersize, this axle was placed under the car by the Union Pacific, Denver & Gulf Railway, and the claim for card should be allowed.

The same is true of the two bolster truss rods undersize.

A card should also be furnished for two foreign center plates; two truck columns, broken, and one oil box wedge, broken.

In the case of the four worn-out brasses, the Union Pacific, Denver & Gulf Railway acknowledged that they placed these brasses in the truck, and card should also be allowed for them.

ARBITRATION CASE No. 463.

CHICAGO & ALTON RAILROAD COMPANY

versus

ATLANTIC & PACIFIC RAILROAD COMPANY.

AXLE 1 INCH TOO LONG NOT PROPER REPAIRS.

In December, 1896, the Chicago & Alton Railroad Company rendered bills against the receivers of the Atlantic & Pacific Railroad for replacing axles applied to C. A. & St. L. car 7534, at Needles, December 7, 1896, and C. & A. car 7606, at Mojave, November 10, 1896. These bills were for \$3 and \$9, respectively, there being one axle replaced under one car, and three under the other. As justification for the bills, it sends joint evidence cards from the Kansas City Inspection Association, stating that C. & A. car 7534 had one foreign axle, 6 feet 3 inches centers, instead of 6 feet 2 inches, which was standard to the car, covered by A. & P. R. R. repair card of December 7, dated at Needles, and that C. & A. car 7606 had three axles wrong on account of being one inch too long, passing Kansas City, covered by A. & P. R. R. repair card, applied November 10, 1896.

The A. & P. R. R. returned the bills, with the statement that it did not know what the standard size of axle is for C. & A. cars of this class, but that the axles put under the cars were the same as those removed, namely, 6 feet 3 inches centers, and 6 feet 11 $\frac{1}{4}$ inches over all; that both the axles removed and those applied were strictly M. C. B. axles, and even if the C. & A. people claim that their axle is 6 feet 2 inches from center to center, they are not justified in making bills, because in repairing cars railroads are allowed to use M. C. B. standards when they do not impair the strength of the car, and the bills are therefore declined.

The C. & A. R. R. Co. replied that repairs to foreign cars shall be promptly made, and shall conform in detail to the original construction, and that companies making repairs to cars with wrong materials shall be liable to the owner for the cost of changing such cars to the original standard, and that the joint evidence of the owner of the car and the delivering road, that the repairs are not proper, shall be final; it therefore believes the bill is correct.

The A. & P. R. R. replied that the C. & A. R. R. did not give the whole of Section 4, Rule 4, and of Section 5, which says, "In repairing damaged cars, M. C. B. standards may be used when of dimensions which do not impair the strength of cars in lieu of parts forming the original construction." It calls attention to the fact that the Arbitration Committee, at a meeting held in Chicago March 23, in the decision of Case 419, states that at the last M. C. B. convention the rules were changed to allow a more extended use of M. C. B. standards.

In the correspondence the fact is shown that in the decision of Case 97 the following occurs: "In the opinion of the committee an axle differing $\frac{1}{4}$ inch between centers of journals from that standard to the car, is an alteration of the original

design which should not be permitted, and the committee believes that no variation whatever in ruling dimensions should be permitted, and is not justified by Rule 16."

Further correspondence failing to settle the matter, it is referred, by mutual consent, to the Arbitration Committee for decision.

DECISION.

The decision in Arbitration Case No. 97, of October, 1891, fully covers this case, and decision is rendered in accordance therewith—that is, the bill of the Chicago & Alton Railroad is correct, and should be paid.

ARBITRATION CASE NO. 464.

CANADIAN PACIFIC RAILWAY COMPANY

versus

JACOB DOLD PACKING COMPANY.

PIN LIFTER LOST NOT ROUGH USAGE.

In January, 1897, the Canadian Pacific Railway Company rendered bill against the Jacob Dold Packing Company for labor repairing one pin lifter, one hour, 20 cents.

The bill was objected to by the Jacob Dold Packing Co., claiming rough usage.

To this the C. P. R'y Co. replies that the charge is made under Section 40 of Rule 3, "loss under fair usage of any part of the body of car, except as provided for in Rule 5, Section 6"; that the car did not receive any rough usage while on its line, and that the bill is correct as rendered.

Further correspondence failing to settle the matter, it is referred, by mutual consent, to the Arbitration Committee for decision.

DECISION.

There is no evidence whatever presented by the Jacob Dold Packing Company to show that their car received rough usage. The Canadian Pacific Company says definitely that it did not receive rough usage. The mere claim of rough usage is not sufficient to warrant a car owner in refusing to pay a bill rendered under the rules, and as this bill is clearly authorized by Section 40 of Rule 3 the bill is considered correct, and should be paid.

ARBITRATION CASE No. 465.
CANADIAN PACIFIC RAILWAY COMPANY
versus
NELSON MORRIS & COMPANY.

SILLS CLAIMED ROTTEN, AND CHARGED TO OWNER WITHOUT AUTHORITY.

In December, 1896, the Canadian Pacific Railway Company rendered bill against the Morris Refrigerator Line for repairs of M. R. L. car 5963 in the month of September, as follows :

Cast iron, 10 pounds.....	\$.15
Bolts, forgings, etc., 208 pounds	6.24
Lumber, 382 feet.....	9.55
Miscellaneous.....	1.50
Labor, 176 hours.....	35.20
Total.....	<u>\$52.64</u>
Credit, cast and wrought scrap.....	1.39
Net charge	<u>\$51.25</u>

The charge for lumber included one head stock, 57 feet; 2 center sills, 187 feet; sheathing, 104 feet; flooring, 30 feet; oak, 4 feet.

The bill was returned by Nelson Morris & Co., claiming that the nature of the repairs done to the car indicated plainly that the car had been wrecked.

The C. P. R'y Co. replied that the car was not in wreck on its line, but that the repairs were necessary owing to the parts being rotten.

Nelson Morris & Co. replied that it was certainly a mistake that the repairs to draft sills and end sills was on account of these parts being rotten, as the car was in its shop from May 19 to May 28, 1896, for general repairs, and left in strictly first-class condition; that its record of the car during July and August shows it as being all right, with the exception of some minor defects, which were repaired; that the car left East St. Louis, via Wabash road, August 31, loaded for Worcester, Mass.; that it was safely delivered at destination without any delay, and while returning home, empty, after traveling over 1,750 miles, and after having been inspected and accepted by several different railroads, it was discovered by the C. P. R'y that the car was no longer safe to run; that the fact that it is charged with 104 feet sheathing, 30 feet 2-inch flooring, two $\frac{3}{8}$ by 9 feet truss rods, one drawbar follower, proves conclusively that the car was wrecked, otherwise it would not have been necessary to apply end sheathing, flooring, truss rods, etc., as this car was equipped with outside end sills, and it therefore declines to pay the bill.

The C. P. R'y Co. shows movement of the car over its line, and from the reports of the conductors who handled that car shows that no damage was done to the car; it also shows statement of the foreman at the shops where the repairs were made to the effect that the car was shopped for draft bolts, and while making these repairs the center sills and head stock were found to be in rotten condition and unsafe to handle in trains. It further states that Nelson Morris & Co. were duly notified of the repairs required to make the car serviceable and fit to be hauled in trains, and

that the repairs were made and bill rendered strictly in accordance with the M. C. B. Rules.

Nelson Morris & Co. replies that the meaning of Sectional Rule 7 is that owners be notified in cases like this of all existing defects, and that no repairs shall be made to such car without the authority of the owner; that the rule in this case was violated, as the correspondence, and especially the notice claimed to be sent, plainly shows that the car in question, at the time the note was written, was undergoing repairs; that the C. P. R'y Co. in making these repairs without its knowledge or authority did so on its own responsibility, and without regard to M. C. B. Rule 7, and in the absence of any authorization from it to make these repairs, it must decline to approve the bill.

Further correspondence failing to settle the matter, it is referred, by mutual consent, to the Arbitration Committee for decision, and in submitting the papers the C. P. R'y Co. says that, in the first place, objection was raised on account of rough usage, which was disproved; it has also been proven that the car was in need of repairs owing to the parts in question being rotten; that it advised Nelson Morris & Co. at the time the car was discovered to be in this condition that it would make the repairs, and that this was the only practical course, under the circumstances, as the repairs were of such nature that the car could not have gone home under a home card; that no mention is made in the first part of the controversy of any objection to bill under Section 1 of Rule 7, and that this point was only raised after the conductors' and superintendent's statements had been attached.

DECISION.

The repairs made on M. R. L. car 5963 was a combination which is not chargeable under the M. C. B. Rules of Interchange, as provided for in note following Section 48 of Rule 3. The M. C. B. rules provide under Rule 7 a course of procedure for cars which are unsafe to run or unsafe to load. The Canadian Pacific Company did not avail itself of the provisions of Rule 7, although it advised the owner that it was repairing the car. The Rules of Interchange in general do not contemplate or authorize extensive repairs to cars involving combinations which are not chargeable to the owner, except under the conditions mentioned in Rule 7, and this is considered a very wise provision of the rule. Under the rules the Canadian Pacific Railway is not warranted in rendering bill for the repairs made, and the same should be canceled.

ARBITRATION CASE NO. 466.

CANADIAN PACIFIC RAILWAY COMPANY

versus

THE G. H. HAMMOND COMPANY.

AXLE REPLACED UNDER CAR NOT STENCILED WITH CAPACITY.

In February, 1897, the Canadian Pacific Railway Company rendered bill against the Hammond Refrigerator Line for wheel and axle work on H. R. L. cars, including therein charges against cars 0285, 0329 and 0275 for one axle removed from each car because they were smaller than the other axles under the cars; that the other axles under the cars indicate that the cars were of 50,000 pounds capacity

while the axles removed were only large enough, according to the limits, for cars of 30,000 pounds capacity; that the cars were not stenciled their capacity, and that it is assumed that they would be loaded up to the capacity the larger axles were intended for, namely, 50,000 pounds.

The H. R. Line objected to the change of these axles, and the C. P. R'y Co. replied that if the cars had been stenciled their capacity it would have been guided by that, but under the circumstances its only course to take was to be guided by the other axles under the cars, and that inasmuch as the repairs had been made and bill rendered in accordance with the M. C. B. Rules it cannot make any change in the charges, but is willing to submit the matter to the Arbitration Committee for decision.

The H. R. Line replied that it could not concede that the C. P. R'y Co. had any right to change these axles; that they were large enough for the cars under which they were used, and that it would have been equally proper for the C. P. R'y Co. to have substituted axles of 30,000 pounds capacity for the larger ones under the cars; that the cars are dressed beef cars and it is impossible to get a load of 30,000 pounds in them—in fact, cannot be loaded to exceed 20,000 pounds or 22,000 pounds—and that the axles are amply large enough for the work they are intended to do.

Further correspondence failing to settle the matter, it is referred, by mutual consent to the Arbitration Committee for decision.

DECISION.

As the Hammond Refrigerator Line cars in question are not stenciled with either light weight or capacity, and each car had three 50,000 pounds capacity axles in service under it, it is decided that the Canadian Pacific was justified in replacing the 30,000 pounds capacity axles under these cars and their bill as rendered should be paid.

ARBITRATION CASE No. 467.

SOUTHERN PACIFIC COMPANY (PACIFIC SYSTEM)

versus

NELSON MORRIS & Co.

BRAKE BEAM PROPERLY CHARGED TO CAR OWNER.

On September 30, 1896, the Southern Pacific Company rendered bill against Nelson Morris & Co. for repairs done September 3 and 15, to M. & Co. car 6698, \$5.98, accompanying same with repair card stub calling for "2 brake beams, 1 brake head, 1 brake shoe, 2 brake fulcrums, 4 brake guide pins, 4 $\frac{3}{8}$ -inch square nuts, 4 $\frac{3}{4}$ -inch square nuts, 1 drawbar key, 1 by 5 by 24 inches, 1 C. F. T. spring hanger, 1 7-inch drawbar spring," repaired because the beams, brake head, shoe, drawbar key and spring hanger were broken, drawbar spring missing and brake guide pins worn out and would not fit C. P. brake beams. In addition to these, the repairs to the car on September 15 were one spring plank, with bolts and labor, for which there is no repair card with the papers.

The bill was returned by Nelson Morris & Co., stating that the car was received at its yards on October 1, 1896, bearing M. C. B. repair card for repairs as stated in the bill, but the car showed plain evidence that the repairs had been necessitated by

rough usage, evidently by derailment or wreck, and the nature of the repairs made indicates such to be the fact; that under the M. C. B. Rules it is not chargeable for such repairs, and the bill is returned with the request that it be canceled.

The S. P. Co. investigated this matter, and found that there was no accident to the car; neither had it been off the track or subjected to unfair usage while in its hands, and it therefore requests that the bill be paid.

The bill was again returned by Nelson Morris & Co., positively declining to accept the charges against this car, and stating that the car was received at its yard from the Union Stock Yards & Transit Co., of Chicago, October 1, 1896, in the following condition :

One wrong drawbar spring, 7 inches in place of 8 inches.

One wrong combination cross key.

Two truck side bearings and one $\frac{3}{4}$ by 12 inch truck bolster bolt broken.

One wrong truck hanger, 2 inches too long, bent and cracked in two places.

One wrong truck hanger pin.

One wrong truck hanger casting, not fitting M. & Co. truck hanger.

One wrong brake lever, 24 inches long, 1-inch keyhole; should be 30 inches long, 1 $\frac{1}{8}$ -inch keyhole.

One S. H. & H. coupler knuckle lock broken and lifting chain gone.

It is stated that the car bore S. P. Co. repair card dated 9-3-96 for some of these repairs; also S. P. Co. repair card 9-15-96 for the other repairs; also S. P. Co. M. C. B. defect card for two pine brake beams, two fulcrums, one pine spring plank, one truck hanger casting and one spring plank casting gone; also Union Pacific System defect card for one spring plank broken; also Union Pacific System repair card for one bottom rod, one lever and one wrought iron jaw applied account of "gone." From this record it believes it cannot in justice accept the bill.

The S. P. Co. replied, that in looking over the bill it believes that some of the details were wrongly entered on the bill, and it makes corrections accordingly, although it does not change the net amount of the bill. It recites these errors and states that as regards the wrong drawbar spring, if Nelson Morris & Co. will obtain the evidence of the delivering road that the drawbar spring was wrong it will cancel this charge; that in regard to the two brake beams and two fulcrums applied September 30, and the spring plank applied September 15, that this was all foreign material and was carded against the S. P. Co., and that Nelson Morris & Co. have rendered bill on account of this defect card for this foreign material, which has been paid, and it therefore believes that under the circumstances its bill is correct as rendered.

Nelson Morris & Co's Superintendent Car Department replied that he saw the car himself and inspected it carefully; that there was no room left to doubt that the car was roughly handled; that its condition plainly indicated such to be a fact, and thoroughly convinced that the repairs were necessitated by unfair usage it declines again to accept the bill. Further correspondence failing to settle the matter, the parties mutually agree to refer it to the Arbitration Committee for decision.

DECISION.

When the papers were returned the second time to the owners of the car it was then argued that the reason for believing that the car had received unfair usage was

owing to its having Southern Pacific repair cards on for other parts than those mentioned in the bill. As none of these repair cards have been submitted to the committee, this feature of the argument will not be considered.

It is not unusual for wooden brake beams to break under fair usage. The Southern Pacific Company was unable to find that the car had been in any accident on or off the track. The car owner furnishes no evidence warranting a contrary opinion.

In the opinion of the committee, the bill of the Southern Pacific Company is correct and should be paid.

ARBITRATION CASE NO. 468.

MISSOURI, KANSAS & TEXAS RAILWAY SYSTEM

versus

NEW YORK, CHICAGO & ST. LOUIS RAILROAD COMPANY.

M. C. B. COUPLER REPLACED BY LINK-AND-PIN DRAWBAR.

In March, 1897, the Missouri, Kansas & Texas Railway Company in Texas rendered bill against the New York, Chicago & St. Louis Railroad Company for repairing cars under M. C. B. Rule 4, in the months of January and February, 1897, as per repair card stubs and statements attached, \$10.33.

This bill included a charge against N. Y. C. & St. L. car 15772, as follows:

210 pounds cast iron	\$3.15
10 pounds wrought iron .....	.30
2 hours' labor .....	.40
	———— \$3.85

Credit.

1 Janney head	\$2.25
10 pounds wrought iron .....	.07
	———— 2.32

Total.....\$1.53

The repair card stub showed that this car received wrong repairs, in that it had received one cast stem drawhead because the top lug of Janney coupler was broken off.

The N. Y. C. & St. L. R. R. Co. returned the bill, calling attention to this charge against car 15772, and asking that it be corrected according to Arbitration Case 393.

The M. K. & T. R'y replied that it did not consider Arbitration Case No. 393 as a parallel one; that if an automatic coupler had been applied, the M. K. & T. R'y would, of course, have billed as per Case 393, but it does not see how it can apply in this case where a common drawbar was applied.

The N. Y. C. & St. L. R. R. Co. replied that it agreed that Case 393 is not a parallel case, as that was a transaction of M. C. B. couplers only, but that the repairs made by the M. K. & T. R'y were wrong; that the M. C. B. couplers should be maintained, but that the requirements of the rules are to have credit for good parts removed. It claims that had the M. K. & T. R'y replaced the M. C. B. coupler in

the car the N. Y. C. & St. L. R. R. Co. would have paid for the same; that it has no use for such material as the M. K. & T. R'y applied to the car and must scrap it, and that the M. K. & T. R'y should be the loser if it does not keep material on hand to maintain M. C. B. couplers.

The M. K. & T. R'y replies to this that if the bill for repairs to this car is accepted as rendered, the N. Y. C. & St. L. R. R. Co. should rebill against the M. K. & T. R'y for wrong repairs, amounting to \$9.35, and under these circumstances it thinks that its bill should stand as rendered.

After further correspondence, in which each party makes statement of different ways of settling the account, the matter is referred, by mutual consent, to the Arbitration Committee for decision, and in so referring it the M. K. & T. R'y states that the N. Y. C. & St. L. R. R. Co. refers to Arbitration Cases 393 and 277, and requests correction and insists on a credit in this case of \$6.05, in which case the M. K. & T. R'y bill would show a balance due the N. Y. C. & St. L. R. R. Co. of \$2.20, and that inasmuch as the N. Y. C. & St. L. R. R. Co. would bill back against the M. K. & T. R'y for these wrong repairs, it cannot consent to change the bill as rendered.

DECISION.

If a railroad company making wrong repairs wishes to collect for such wrong repairs, the debits and credits must be in accordance with the rules. The case under consideration concerns M. C. B. couplers, and the prices allowed do not work to the advantage of the road making the wrong repairs.

In the opinion of the Arbitration Committee, the rules allow choice of another course, which it decides should be followed in this case, namely, that the Missouri, Kansas & Texas cancel its bill for the wrong repairs and furnish the New York, Chicago & St. Louis Railroad Company with an M. C. B. defect card authorizing proper repairs to the car.

NOTE.—*Mr. Mackenzie being interested in this case, was not a party to the decision.*

ARBITRATION CASE No. 469.

LAKE SHORE & MICHIGAN SOUTHERN RAILWAY COMPANY

versus

LAKE ERIE & WESTERN RAILROAD COMPANY.

JOURNAL BEARINGS RENEWED ACCOUNT HARD SPOTS.

In December, 1896, the Lake Shore & Michigan Southern Railway Company rendered bills against the Lake Erie & Western Railroad Company for repairs to cars, as per M. C. B. Rules, attaching repair card stubs to the bills.

The bills were returned by the L. E. & W. R. R. Co., objecting to the charges against twenty-one cars, the repair card stubs giving as reasons for removal, "hard spots" and "bright and hard spots," claiming that this is something new in journal-bearing defects, and there is nothing in the rules to justify it.

To this the L. S. & M. S. R'y Co. replied, that the terms shown on the back of the stubs giving the reasons for making the repairs are not as clear as they should be; that the terms do not, in reality, give the reasons for which the bearings were neces-

sarily removed, but simply give the condition of the bearings after the boxes run hot; that these hard and bright spots are caused by small particles of waste attaching themselves to the journal, and are carried round, getting in between the journal and the bearing. The result is they become hot, carbonize, and cause the oil to burn as it comes in contact with the carbonized spot. As there were no other parts of the running gear of the cars needing renewal, and as the boxes were given proper attention while in its possession, it maintains that the charges are proper, and refers to Arbitration Case 403 in support of its position that it might have used the term "hot box" on the back of the stubs to show the reason for making the repairs, but preferred to state the actual condition of the bearings removed, which is conclusive that the journals were hot.

The L. E. & W. R. R. Co. replies that the repair card stubs make no mention of the boxes running hot, and for that reason it objects to the bills; that it is inclined to believe that the brasses were removed without just cause, and that the hard and bright spots are more imaginary than real, and as for small particles of waste getting in between the journal and the bearing and causing hot boxes, that is an old and exploded idea; it has been repeatedly tried without causing a hot box or injury to the bearing, and that the claims that they were removed on account of running hot is rather late, as this claim is not made until after the bills are disputed; that Section 16, Rule 4, reads, "When repairs of any kind are made to foreign cars, a repair card shall be attached to the car specifying fully the repairs made, and the reasons for same"; that in these cases no mention is made of the brasses running hot, the repair cards simply stating "hard spots" and "bright spots," and these, in its opinion, are not legitimate reasons for making repairs and charging owners, and it therefore declines to approve the bill for payment.

Further correspondence failing to settle the matter, it is referred, by mutual consent, to the Arbitration Committee for decision.

DECISION.

The terms "hard spots," "bright spots," "copper spots," etc., express the general condition that a brass is found in after it has reached the hot stage. It has been ruled that hot boxes are not necessarily due to unfair usage. There is nothing submitted in the correspondence that warrants a conclusion that the brasses were not chargeable to the car owner.

In the opinion of the committee, the bill of the Lake Shore & Michigan Southern Railway Company is correct, and should be paid.

ARBITRATION CASE NO. 470.

HAMMOND REFRIGERATOR LINE

versus

NEW YORK, NEW HAVEN & HARTFORD RAILROAD COMPANY.

TAIL PIN IN PLACE OF POCKET DRAWBAR.

On March 9, 1897, the G. H. Hammond Co. rendered bill against the New York, New Haven & Hartford Railroad Company, including, among other items, a charge against H. R. L. car 074 for one drawbar and pocket applied, based on defect card of the N. Y. N. H. & H. R. R. Co., calling for "1 drawhead, one 16-inch spindle in place of one pocket drawhead."

The bill was returned, by the N. Y. N. H. & H. R. R. Co. with the request that the charge for this drawbar be eliminated from the bill, as the defect card showed that the spindle drawbar was applied in place of pocket bar, and is authority for changing the rear attachments only.

The G. H. Hammond Co. replied that it does not agree with this interpretation of the matter; that to return this car to its original design it was obliged to put in a pocket drawbar, and the charge for same is correct.

Further correspondence failing to settle the matter, it is referred, by mutual consent, to the Arbitration Committee for decision.

DECISION.

This case is similar to Arbitration Cases Nos. 239, 252 and 286. In the opinion of the committee, the bill of the G. H. Hammond Company should be changed, eliminating the charge for the drawbar against car No. 074.

ARBITRATION CASE NO. 471. DES MOINES UNION RAILWAY COMPANY *versus* MISSOURI PACIFIC RAILWAY COMPANY.

TRUSS RODS WELDED AND BILLED TO OWNER.

In November, 1896, the Missouri Pacific Railway Company rendered bill against the Des Moines, Northern & Western Railroad Company for welding two truss rods on D. M. N. & W. car 511, and attached repair card stub to the bill, giving as cause for repairs, "old truss rods broken." The bill was objected to by the D. M. N. & W. R. R. on the ground that when the car reached home one of the truss rods was broken, clearly showing it to have been overheated in making the weld, and claiming that the charge should be made for but one truss rod repaired.

The M. P. R'y Co. insists that the repairs were properly made, and shows from the record of the joint inspector between the road and the road over which the car left its line that no defects existed on the car when it left the road, and says that it is not responsible for any damage that might have been done after the car left its line, and therefore its bill is correct.

The correspondence failing to settle the matter, it is referred, by mutual consent, to the Arbitration Committee for decision, and in submitting it the D. M. N. & W. R. R. Co. states that the M. P. R'y Co. claims, and doubtless did weld two truss rods on this car, attaching repair card to cover same, and rendered bill, but when the car reached Des Moines one of the truss rods was broken, showing that it was overheated in welding; that under the rules this is an owner's charge, but it contends that the owner has the right to insist on having the repairs made properly, which was not done in this case, consequently the M. P. R'y Co. bill should be for repairs of one truss rod instead of two.

DECISION.

There is no evidence in the inclosed correspondence to show that the broken truss rod in Des Moines, Northern & Western car No. 511, when it arrived home, was broken where it had been welded by the Missouri Pacific Railway Company, but

as it is claimed by the former road that the iron was burnt it may be inferred that the breakage was at the weld. The structure of iron that has been overheated is very similar to that of iron of inferior quality, having little or no fiber. The fact that the truss rod in question broke twice, and one other broke also, without evidence of unfair usage, would indicate that they were either too light or the iron of poor quality—most likely the latter; and as there is no question as to the responsibility of the car owner for repairs of parts similar to that in question which may fail under fair usage, it is the opinion of the committee that the bill of the Missouri Pacific is correct and should be paid.

ARBITRATION CASE NO. 472.

SAN ANTONIO & ARANSAS PASS RAILWAY COMPANY

versus

ST. JOSEPH & GRAND ISLAND RAILWAY COMPANY.

TIME ALLOWABLE FOR RENEWING SAND PLANK.

In February, 1897, the San Antonio & Aransas Pass Railway Company rendered bill against the St. Joseph & Grand Island Railway Company for repairs to cars as per M. C. B. Rules, accompanying the same with repair card stubs, showing that it renewed one sand board, one bottom brake-hanger pin, two truck hangers, three center-plate bolts, on account of sand board broken, with bolts broken and gone, and the hangers broken under fair usage. The bill charged 16 hours' labor at 20 cents, \$3.20, and the total net amount of the bill was \$4.60.

The St. J. & G. I. R'y Co. returned the bill, stating that the charge of 16 hours for labor is excessive, and that all the repairs in question could have been made, in its estimation, in 8 hours, and requests that the bill be reduced accordingly before it could voucher it, stating that this is a swing bolster truck, and the sand board and all repairs pertaining thereto could have been made in 5 hours, and with 3 hours additional allowed for center plate in accordance with the rules, or 8 hours, would cover the total time.

The S. A. & A. P. R'y Co. replied that it had renewed the center-plate bolts in both center plates, and that the rules of the previous year allowed 10 hours for the sand plank, although not in the rules of this year; it therefore believes the bill is correct as rendered.

The St. J. & G. I. R'y Co. replied that the fact that last year's rules allowed 10 hours for a spring plank had nothing to do with it, and that it had made similar repairs in 5 hours, and still requests that the bill be reduced.

The S. A. & A. P. R'y replied that it was unable to do all the work which was charged against the car in less time than that charged for.

After all this correspondence the St. J. & G. I. R'y Co. made further objection to the bill not heretofore mentioned, stating that one of these parts, either the hanger or sand plank, failed under fair usage, and the balance of the repairs is consequential damage, and as such should be eliminated from the bill; it refers to the decision of the Arbitration Committee as quoted in Case No. 377. It does not undertake to say definitely which of the parts failed under fair usage, and which is consequential damage.

The S. A. & A. P. R'y Co. replied to this claim that it does not understand the matter in the same light, but believes that the bill is entirely correct as rendered.

Further correspondence failing to settle the matter, it is referred, by mutual consent, to the Arbitration Committee for decision.

DECISION.

The Arbitration Committee believes that the time chargeable for renewing sand plank, as allowed in the rules of the previous year, should apply. As the center-plate bolts were renewed in both ends of the car, the time charged, namely, 16 hours, is not excessive.

In regard to the claim that only one of these parts failed under fair usage and that the balance was consequential damage, the Arbitration Committee is of the opinion that this claim cannot be sustained, and that the bill should be paid as rendered.

ARBITRATION CASE No. 473.

CHICAGO & WEST MICHIGAN RAILWAY COMPANY

versus

CHICAGO & EASTERN ILLINOIS RAILROAD COMPANY.

M. C. B. COUPLER REPAIRED, CREDITS ALLOWABLE.

In March, 1897, the Chicago & West Michigan Railway Company rendered bill against the Chicago & Eastern Illinois Railroad Company for replacing one Gould coupler on C. & E. I. car, accompanying same with repair card calling for "One Gould coupler stem broken." The bill made a charge of \$8.31 net.

The C. & E. I. R. R. Co. objected to the bill, stating that the amount charged should be \$7.56 instead of \$8.31, and the charges and credits should be as follows:

One Gould coupler	\$12.50	
Two hours' labor at 20 cents .....	.40	
		\$12.90
<i>Credit:</i>		
145 pounds steel (Chicago coupler), $\frac{3}{4}$ cents	\$ 1.09	
One Chicago knuckle	3.50	
One pivot pin .....	.30	
One lock arm .....	.30	
One lifting pin .....	.10	
One knuckle opening spring .....	.05	
		\$ 5.34

Net charge.....\$ 7.56

and asked to have the bill corrected

The C. & W. M. R'y replied, stating that it did not agree that the bill should be made up in this manner; that according to M. C. B. Price List No. 4, the Chicago coupler is only \$11, whereas the detail parts quoted foot up \$11.75. It declined to make any change in the bill because the C. & E. I. buys the couplers complete at \$11 each.

The C. & E. I. R. R. Co. replied that the C. & W. M. R'y had a right to charge the full price for the coupler applied, but that in allowing credits for the good parts

of the coupler released it must allow full credit for the value of such parts as per M. C. B. Price List No. 4, and in support of its position refers to Arbitration Case No. 393.

Further correspondence failing to settle the matter, it is referred, by mutual consent, to the Arbitration Committee for decision.

DECISION.

The Arbitration Committee understands from the correspondence that a Gould coupler was placed in this car which was originally equipped with a Chicago coupler, and of which the drawhead broke. As the figures given by the Chicago & Eastern Illinois Railroad Company for the credit of parts of the Chicago coupler which were not broken are in accordance with Price List No. 4, the Arbitration Committee is of the opinion that this is correct, and that the Chicago & West Michigan Railway should correct its bill accordingly.

ARBITRATION CASE NO. 474.

CENTRAL OF GEORGIA RAILWAY COMPANY

versus

CINCINNATI, NEW ORLEANS & TEXAS PACIFIC RAILWAY COMPANY.

SIDE DOOR NAILED TO CAR AND CARDED.

In February, 1897, the Central of Georgia Railway Company rendered bill against the Cincinnati, New Orleans & Texas Pacific Railway Company, for \$5, for one side door on L. & N. car 15837, basing same on defect card of the C. N. O. & T. P. R'y, issued at Chattanooga, August 14, 1896, and attached to this car, calling for "one side door nailed to side of car, and one door stile split."

The bill was returned with exception to the amount of the charge, with the statement that the card does not authorize bill for a ventilator door; that the car was carded by it at Chattanooga for ventilator door nailed to car, and one door stile split, and was accepted by its connections on this card, and that the company was, therefore, relieved of responsibility, further than the charge for labor hanging the door, and the material and labor for one door stile, which should not amount to more than 75 cents.

The C. of Ga. R'y Co. replied that the position taken by the C. N. O. & T. P. R'y Co. would have been correct had the car gone to the owner over the C. of Ga. R'y in the same condition as it was when carded, but that the C. N. O. & T. P. R'y preferred to give a card for improper and temporary repairs, and in consequence of these repairs the door fell off on the line of the C. of Ga. R'y, and it was obliged to issue a card for one side ventilator door gone; that the owner made the renewal on the strength of this card, and billed against it for \$5, which it had paid, and that this bill against the C. N. O. & T. P. R'y is to offset charges already paid. The C. of Ga. R'y Co. further says, that it would have repaired the door had it known in advance that it would be lost off, and it believes that the C. N. O. & T. P. R'y card carries with it all responsibility for omission to properly secure the door in a workmanlike manner to the car.

The C. N. O. & T. P. R'y replied that it does not believe the M. C. B. defect card attached to these papers authorizes a further charge than it has already stated; that the door was in perfect condition with the exception of the hanger, and was securely fastened to the car when delivered to its connections, and it accepted the car on this card; that if the door became loose after being accepted, the road handling it had a perfect right to secure it to the car in a proper manner, and bill on the card, but neglecting to do so the door has been lost, and therefore the line on which the loss occurred becomes responsible for its replacement.

Further correspondence failing to settle the matter, it is referred, by mutual consent, to the Arbitration Committee for decision.

DECISION.

The Cincinnati, New Orleans & Texas Pacific Railway Company's defect card was issued to cover one side door nailed to side of door, and one door stile split. The Central of Georgia Railway Company received the car with the door in this condition, protected by the defect card. It was, therefore, the duty of the Central of Georgia Railway Company to either deliver the car to the owner in this condition, or, if it was necessary to load the car, and the lading was of such a nature as to require the use of this door, to make the necessary repairs, and bill against the Cincinnati, New Orleans & Texas Pacific Railway Company for the cost of same. In accepting and moving the car in this condition it assumed all responsibility for any subsequent damage that might occur, and its failure to see that the door was properly secured does not entitle it to collect from the Cincinnati, New Orleans & Texas Pacific Railway Company for the cost of the door which was lost on its line.

In the opinion of the committee, the bill of the Central of Georgia Railway Company is not correct, and should be canceled.

ARBITRATION CASE No. 475.

LAKE SHORE & MICHIGAN SOUTHERN RAILWAY COMPANY

versus

CHICAGO, ROCK ISLAND & PACIFIC RAILWAY COMPANY.

DECAYED PARTS CHARGED TO OWNER WITHOUT AUTHORITY.

In December, 1896, the Lake Shore & Michigan Southern Railway Company rendered bill against the Chicago, Rock Island & Pacific Railway Company for repairs to C. R. I. & P. car 20002, as follows:

Lumber, 111 feet.....	\$2.78
Bolts, nuts, forgings, etc .....	.18
Nails, paint, etc .....	.33
Labor, 20 hours.....	4.00
Total	\$7.29
Credit, wrought scrap.....	.04
Net charge	\$7.25

and attached repair card stub thereto reading as follows: "2 center sills, 1 intermediate sill spliced, 16 pieces end sheathing, 2 pieces end lining, 2 long body truss rods repaired, 1 draft spring, 2 buffer block rods, 1 end sill, and 1 follower straightened."

The reasons for making the repairs, as given on the back of the repair card stub, are that the first seven items were broken, the eighth item rotten and the last item bent.

The bill was returned by the C. R. I. & P. R'y Co., stating that on account of the reasons for making the repairs given on the repair card stub, it is of the opinion that the car was roughly handled, and under Rule 3 it is not responsible, as this rule provides "damaged longitudinal sills, if necessitating replacement or splicing of more than two sills"; that this relieves the owner of the car of responsibility, and asks to have the bill corrected.

To this the L. S. & M. S. R'y Co. replies that its charge is made up of one end sill, end sheathing and inside lining; that this end sill was not damaged, but was thoroughly rotten; that it has also charged for five boards of end sheathing which had rotted off back of the face block, and two boards of inside lining, owner's defects. The balance of the charge is for end sheathing broken or damaged in removing the end sill.

The C. R. I. & P. R'y Co. still insists that this car had received rough usage, and under Rule 3 the charge should be canceled.

The L. S. & M. S. R'y Co. further replies that the charge on this bill is not necessitated, in any sense, by rough usage; that the charge does not include any expense whatever on account of renewing longitudinal sills; that it simply covers the cost of renewing one end sill which was so thoroughly rotten that it was impossible to replace it when replacing the broken center sill, and does not include any charge for replacing the center sill; that it does include the necessary expense on account of renewing part of the end sheathing which was necessarily damaged in removing the end sill.

Further correspondence failing to settle the matter, it is referred, by mutual consent, to the Arbitration Committee for decision.

DECISION.

It is not disputed that the car was damaged through unfair usage as defined by the rules. The question involved is whether a company making repairs to a car damaged by unfair usage can, at the same time, make repairs to other allied parts which are decayed and charge this portion of the work to the car owner. The Rules of Interchange do not provide for such a case, except in Section 1 of Rule 7, where a car is in generally worn-out condition due to age or decay. It is the opinion of the committee that in such a case as this it would be best to consider Rule 7 as applying, and that the repairs to decayed parts not damaged but allied with damaged parts should not be charged to the owner without first getting authority to make such repairs at the owner's expense.

It is the opinion of the committee that the bill of the Lake Shore & Michigan Southern Railway Company is not correct and should be canceled.

ARBITRATION CASE NO. 476.

WESTERN NEW YORK & PENNSYLVANIA RAILROAD COMPANY

versus

ST. MARY'S & SOUTH-WESTERN RAILROAD COMPANY.

DECAYED PARTS CHARGED TO OWNER WITHOUT AUTHORITY.

On December 14, 1896, the St. Mary's & South-Western Railroad Company rendered bill against the Western New York & Pennsylvania Railroad Company for repairs to W. N. Y. & P. car 2203, at St. Mary's shops, and attached thereto repair card stub calling for "one end sill, one draft timber and one door shaft latch," total amount of bill, \$4 70.

The W. N. Y. & P. R. R. Co. returned the bill, stating that the charges embraced repairs to end sill and draft timbers; that these items together constitute a combination classed as unfair usage, and as such are not chargeable to the car owner, and asks to have the bill withdrawn.

The St. M. & S.-W. R. R. Co. replied that the car was in a wreck breaking two end sills, making it necessary to repair them; that the draft timbers and end sill were so rotten after being taken out that they were not fit to put back again into the car, consequently the repairs as shown on the bill were made to make the car safe to run. It states, that had this car been returned to the W. N. Y. & P. R'y for repairs it could not have billed against the St. M. & S.-W. R. R. Co. for the end sill and draft timbers, and it is entirely just that it should be paid for these parts.

The W. N. Y. & P. R'y returned the papers, calling attention to the preface on page 2 of the Code of Rules of 1896, which states that a railroad company handling cars is responsible for damage done to any car by unfair usage, derailment, accident or improper repairs; that the St. M. & S.-W. R. R. Co. has stated that this car was wrecked, and it believes under these conditions the bill should be withdrawn.

The St. M. & S.-W. R. R. Co. replied to this that the items for which the W. N. Y. & P. R. R. Co. is charged were so rotten that they could not be put back in the car, and that they were not damaged in the wreck, and suggests that the matter be referred to the Arbitration Committee, and the W. N. Y. & P. R. R. Co. so refers it, for decision.

DECISION.

This case is similar to Arbitration Case No. 475, and it is the opinion of the committee that a similar ruling should apply.

ARBITRATION CASE NO. 477.

KANSAS CITY, PITTSBURG & GULF RAILROAD COMPANY

versus

KANSAS CITY, WATKINS & GULF RAILWAY COMPANY.

ROUGH USAGE NOT SHOWN UNDER THE RULES.

In January, 1897, the Kansas City, Pittsburg & Gulf Railroad Company rendered bill against the Kansas City, Watkins & Gulf Railway Company, total amount \$3.21, on account of repairs to K. C. W. & G. car 620, accompanying the same with a repair card stub reading, "1 draft timber, 2 lugs, 1 deadwood, 2 lug

straps, 10 bolts $\frac{3}{8}$ by 18 inches, 2 bolts $\frac{3}{4}$ by 9 inches, and 6 bolts $\frac{3}{4}$ by 6 inches," and giving reasons for making the repairs that the draft timber was decayed, timber bolts broken and lugs and strap broken.

The K. C. W. & G. R'y Co. returned the bill, objecting to same because simultaneous damage of two lugs, one deadwood and all bolts as shown on the stub, constituted, in its opinion, unfair usage according to the M. C. B. Rules.

The K. C. P. & G. R. R. Co. replied that the repairs were made necessary by the decayed condition of the timbers and not by rough usage; that both ends of the car were repaired.

The K. C. W. & G. R'y Co. replied that if there had been much decay there certainly would not have been such breakages, and declines to pay the bill.

The K. C. P. & G. R. R. Co. replied that one draft timber was badly decayed at the north end of the car; also, deadwood was badly decayed at same end, and the timber bolts were broken in same end of car, caused by the decayed condition of draft timbers; that two lugs were broken on same end of the car, caused by the decayed condition of the draft timbers, and that there were six lug bolts and two-strap bolts broken on the other end of car; that the car received no rough usage while on its line.

Further correspondence failing to settle the matter, it is referred, by mutual consent, to the Arbitration Committee for decision.

DECISION.

The note after Section 48 of Rule 3 specifies certain combinations of breakages to parts of cars which, if they occur simultaneously, are not chargeable to the car owner. The repairs made to K. C. W. & G. car 620 are not covered by any of the combinations specified.

In the opinion of the committee, the bill of the Kansas City, Pittsburg & Gulf Railroad Company should be paid.

ARBITRATION CASE NO. 478.

MISSOURI PACIFIC RAILWAY COMPANY.

versus

CANDA CATTLE CAR COMPANY.

BEARING CHARGE ALLOWED IN RENEWING WHEEL.

In March, 1897, the Missouri Pacific Railway Company rendered bill against the Canda Cattle Car Company, for one pair of wheels and axle each applied to the latter company's cars 1019 and 1897, on account of one wheel being worn flat on one axle, and two wheels on the other axle being shelled out. In addition thereto, it also makes charge for two brasses applied to each of these axles on account of the old brasses being worn too much to fit the new axles.

It also makes a charge against C. C. C. Co. car 2230 for one side door applied, \$5, crediting \$1, amount \$4, on account of the old door being decayed and part gone.

The bill was returned by the C. C. C. Co., objecting to these charges, to which the M. P. R'y Co. replied, that the wheels were removed from these cars on account

of defects properly chargeable to the car owners; that it is not required by the rules to immediately take wheels to the press and have them pressed off so as to reapply the old axle; that it applied standard wheels and axles to the car and avoided any delay to the car on account of pressing off the defective wheels; that the old brasses were too much worn to fit the new journals properly, and it was necessary to apply new brasses, which it does not think it should stand the expense of.

In regard to the new door applied to car 2230, it states that the old door was nearly all gone, and the parts remaining were so much decayed as to be useless, and new door was required.

The C. C. C. Co. replies that it still believes it is not responsible for the brasses applied to these cars; that the stubs state that the old brasses would not fit new journals, and nothing whatever is said about them being worn out; neither the brasses nor the axles were worn out or defective, nor were they the causes necessitating the changes in the wheels; that only one wheel was required to be changed under one car and two wheels under the other, and it contends that the usual labor charge of \$1.50 covers all the work necessary to be done incidental to removing one or two defective wheels on the same axle and substituting one or two good wheels and replacing under the car good wheels on the axle taken out; that if its understanding of this is not correct, then there is no reason why more than 75 cents should be charged for labor of changing one wheel. If the work had been done in accordance with its understanding of the rules and the original axles were replaced under the cars, the old brasses not having been worn out, could have gone back on the old journals and would have given further service. It further claims that there is no section of the Rules of 1896, nor is there any decision up to No. 452 which justifies a charge against car owners for new brasses applied simply because the brasses removed with one axle, the axle and brasses both being good, the axle being removed because of a worn wheel or wheels, will not fit another axle substituted. Case 352 decided under the Rules of 1894, presents a statement of facts not parallel with this case, yet the decision construed Rule 8, which says that car owners shall be chargeable with journal bearings needing renewal, as follows: "This has reference to bearings renewed under fair usage, such as when a brass is worn out or has to be renewed on account of change of axles." Section 18, Rule 8 (1896), reads: "Defective, missing or worn out parts of trucks not elsewhere provided for which have failed under fair usage," owners responsible.

Regarding the door applied to car 2230, it thinks this matter is covered by Arbitration Case 307 notwithstanding that that decision was under the Rules of 1894. It was then said that a damaged side door would cost less to repair even though it should have all the woodwork renewed than an entirely new door; that if this was true in 1894 it is certainly true in 1897.

Further correspondence failing to throw any new light on the matter, it is referred, by mutual consent, to the Arbitration Committee for decision.

DECISION.

It is the practice in renewing wheels under cars in transit to use wheels already mounted, so as to delay the car and lading as little as possible. When a new journal bearing is made the radius of the portion which bears on the journal is made greater than the radius of the journal upon which it is to be used. It is the universal prac-

tice in renewing axles under cars to use new bearings, for the reason that the old bearings will usually not fit properly, and in this case the evidence shows that the diameters of the journals of the axles removed were smaller than those applied. Therefore, the bearings were too small to be used on the axles applied. It cannot be expected that the railroad company making an exchange of wheels under a foreign car shall preserve the bearings removed to use them on the axle removed when it is applied again, unless on account of unusual design it is thought desirable to use the same axle.

In regard to the charge for door on car 2230, this should be corrected to conform in principle with the decision in Arbitration Case 307, and it is the opinion of the committee that when thus corrected the bill of the Missouri Pacific Railway Company should be paid.

ARBITRATION CASE NO. 479.

MISSOURI PACIFIC RAILWAY COMPANY

versus

MISSOURI, KANSAS & TEXAS RAILWAY COMPANY.

WHEELS CHARGED TO OWNER SUBSEQUENTLY FOUND "OUT OF GAUGE."

On December 17, 1896, a pair of wheels was changed under M. P. car 9267 at Armstrong shops of the Union Pacific Railway Company on account of wheels being $\frac{3}{8}$ inch out of gauge, too narrow. The car arrived at the Atchison shops of the Missouri Pacific Railway bearing repair card of the Union Pacific road for change of wheels referred to, and the car had a number of other defect cards, showing that it had been in trouble at some point. In tracing the matter up the M. P. R'y found that the car was damaged on the M. K. & T. R'y and partially repaired, and that it got away from that road by mistake without the repairs being completed. The M. K. & T. R'y upon request furnished defect card for the balance of these defects. The wheels, however, were applied at the same time, and the M. K. & T. R'y claims that they were of proper gauge, as special pains were taken at their Parsons shops to gauge the wheels when applied, and on this account it declines to furnish a defect card for the wheels being out of gauge. After these wheels had been put in the car, the M. K. & T. R'y delivered it to the M. P. R'y at Moody, where it had no inspector, and it moved direct to Kansas City over the home line, where it was delivered to the Union Pacific road. The Union Pacific road states positively that the wheels in question were $\frac{3}{8}$ inch less than the prescribed limits between flanges, as required by the rules; that they were gauged all around, showing that the axle was not bent, and that there was nothing to show that the wheels had been improperly bored; that they measured between flanges 4 feet $4\frac{3}{8}$ inches, while the standard is 4 feet $5\frac{1}{4}$ inches.

In anticipation of a bill being rendered by the Union Pacific road against the M. P. road for the cost of changing the wheels, the M. P. R'y requested the M. K. & T. R'y to protect it by a defect card for the wheels out of gauge, which the M. K. & T. R'y declined to do on account of the fact that the wheels were mounted for stock, and that they are very careful to see that they are not mounted out of gauge, and it believes it is impossible to make a mistake of $\frac{3}{8}$ inch.

The M. P. R'y claims that the statement of the Union Pacific road is definite; that the wheels were gauged and had been drawn from the axle because of improper mounting, and the claim of the M. K. & T. R'y that the wheels were properly mounted is only a general statement from its usual practice, and it believes the M. K. & T. R'y should furnish a defect card to cover the wheels out of gauge.

The correspondence between the three parties to this matter shows that all wish to have the matter decided by the Arbitration Committee.

DECISION.

Two interests are involved in this case :

(A). Union Pacific and Missouri Pacific.

(B). Missouri, Kansas & Texas and Missouri Pacific.

(A). The car owner delivered its car to the Union Pacific at Kansas City December 16, 1896. Section 12 of Rule 3 says : "Wheels loose or out of gauge.—Owners responsible." The car owner, therefore, is clearly responsible to the Union Pacific for the expense of placing wheels under the car in proper gauge, December 17, 1896, and the Union Pacific bill should be paid.

(B). The second question is whether the car owner is justified in assuming that the pair of wheels found out of gauge and changed by the Union Pacific, December 17, 1886, was in that condition when it was applied by the Missouri, Kansas & Texas at its Parsons shops, November 28, 1896. The rules provide for a joint evidence card for the protection of car owners in case of wrong repairs. In the case of M. P. car 9267, the owner had it on its line for six days without taking any exception to the wheels or finding anything wrong with them, although there is evidence that they gave the car a careful inspection at Kansas City December 15, 1896, at which time eight wrong journal boxes were claimed and allowed for, but no fault with the wheels was discovered.

In the opinion of the committee, the Missouri Pacific has not produced sufficient evidence to warrant holding the Missouri, Kansas & Texas responsible for the wheels out of gauge.

ARBITRATION CASE NO. 480.

SOUTHERN PACIFIC COMPANY (PACIFIC SYSTEM)

versus

UNION PACIFIC SYSTEM.

JANNEY KNUCKLE, CREDIT FOR.

On October 2, 1896, the Union Pacific System attached defect card to C. F. T. car 1305, calling for "One Janney knuckle in place of California knuckle." On October 31, 1896, the Southern Pacific Company rendered bill against the U. P. System for repairs to this car and attached the defect card as authority for bill. The bill read as follows :

One California knuckle.....	\$3.50
Credit, wrought scrap	2.25
	<hr/>
Net charge	\$1.25

The bill was returned by the U. P. R'y with the claim that it should be credited with the serviceable value of the Janney knuckle, i. e., \$3.25.

To this the S. P. Co. replies that it has allowed all that it is worth to that company and all that is required under the M. C. B. Rules; that the knuckle was removed on account of the defect card, and under the rules it had a right to make the proper repairs before accepting the car; that the U. P. System could have made the proper repairs if it had seen fit to do so, but it did not so elect, but preferred to turn the car over with a defect card for some one else to do the work, and under these conditions it cannot be expected that that company will stand the difference between a new Janney knuckle and a scrap knuckle, as that is all it is worth to that company, as the M. C. B. Rules do not allow the use of secondhand knuckles on a foreign car, and it has no cars equipped with Janney knuckles. It, however, agrees to deliver the Janney knuckle to the U. P. R'y on its authority to render bill for the value of the scrap credit allowed, that is, 27 cents.

The U. P. System replies that, according to the Price List No. 3, this knuckle is worth \$3.25, and inasmuch as it is in good condition, the S. P. Co. should give credit for its full value; that the correctness of its claim is exemplified in Arbitration Case 393; in this case a Gould coupler complete was applied in place of a Janney coupler broken, and it will be noted that the Arbitration Committee decided that credit should be allowed for the scrap in the Janney drawbar and the full value of the good parts released; while this is not a parallel case with the one charged for in this bill, the point wished to be made is covered by the decision referred to, and it thinks the S. P. Co. will reach the same conclusion and allow a credit of \$3.25 for the Janney knuckle.

The S. P. Co. replies that this car was carded for wrong material, placing the responsibility on the U. P. R'y; that there is no question but that under Rule 4, Section 2, it is justified in making these repairs, the only question being the amount of credit to be allowed for the wrong knuckle; that as the M. C. B. Rules will not allow a charge for a secondhand knuckle, and as it has no cars equipped with the Janney couplers, this knuckle is really worth no more to it than the amount allowed, as it cannot take advantage of the offer of the manufacturer on account of the expense in making the change. Arbitration Case 393 is not a parallel case, as that was for repairs chargeable to the owner, while its bill is for repairs on account of defect card.

Further correspondence failing to settle the matter, it is referred to the Arbitration Committee, by mutual consent, for decision.

DECISION.

As the controversy hinges on allowing proper credit for a secondhand Janney knuckle removed, attention is invited to Arbitration Committee Case 393, in which the committee rules that the proper credit for a secondhand Janney knuckle is the difference between the manufacturer's price.....\$3.25 and the replacement price..... 1.00

Total credit\$2.25

This being the decision of the Arbitration Committee in the case of the Pennsylvania Company vs. Iowa Central Railway Company, the bill of the Southern Pacific is correct and should be paid.

ARBITRATION CASE NO. 481.

TERRE HAUTE & INDIANAPOLIS RAILROAD COMPANY

versus

CHICAGO REFRIGERATOR CAR LINE.

DOOR MISSING, OWNER'S DEFECT.

In April, 1897, the Terre Haute & Indianapolis Railroad Company rendered bill against the Chicago Refrigerator Car Line for repairs to C. R. C. Line car 211, accompanying same by repair card stub calling for "one new door, applied on refrigerator car" on account of the door missing. The net amount of bill was \$5.93, the door being charged at actual cost, \$6.10, and there being allowed a credit of 17 cents for scrap.

The C. R. C. Line returned the bill, advising that under the M. C. B. Rules a railroad company cannot bill upon a car company for the missing door; that the door was originally attached to the car body with large strap hinges, and can only be torn from the car by the extremest of rough usage.

The T. H. & I. R. R. Co. replied that the M. C. B. Rules clearly make missing car doors chargeable to car owners, and the Arbitration Committee has repeatedly passed upon the question; that the fact that the door was secured to the car with large strap hinges makes no difference, and that ordinary wear and tear will sooner or later cause the screws and hinges to work loose.

The C. R. C. Line does not understand that the rules make missing doors chargeable to car owners, and it believes that the cases which the Arbitration Committee has passed upon are not identical with the case in question; that the fact that the door was secured to the car with large strap hinges would make all the difference necessary for the Arbitration Committee to decide the other way; that the door was flush with the side of the car and there is no possible way which it could be lost of other than by rough usage.

The T. H. & I. R. R. Co. replied that it had carefully investigated and finds that the car was not in any trouble or roughly used while in its hands, but that the door fell off between stations, and in falling was so badly damaged that it could not be repaired.

Further correspondence failing to settle the matter, it is referred, by mutual consent, to the Arbitration Committee for decision.

DECISION.

Under Arbitration Committee decisions in a number of cases already decided (see Cases 382 and 386) missing doors are car owners' defects, and, therefore, the Terre Haute & Indianapolis Railroad Company's bill is correct and should be paid.

JNO. W. CLOUD,

Secretary.

974 ROOKERY BUILDING,
CHICAGO, ILL., August 7, 1897.

MINUTES OF MEETING HELD IN CHICAGO, NOVEMBER 17, 1897.

Members present: G. W. Rhodes, Chairman; M. M. Martin, G. L. Potter,
John Mackenzie, J. N. Barr.

ARBITRATION CASE NO. 482.

PENNSYLVANIA RAILROAD COMPANY

versus

JACOB DOLD PACKING COMPANY.

M. C. B. COUPLER CHARGED. CLAIMED TO BE OLD.

On January 30, 1897, the Jacob Dold Packing Company rendered bill against the Pennsylvania Railroad Company for \$12.30, for one Gould coupler, complete, applied to J. D. P. Co. car 857, \$12.50; 2 hours' labor, .40; credit, 160 pounds malleable iron, at $\frac{3}{4}$ cent, .60; net amount of bill, \$12.30. The bill was accompanied by P. R. R. repair card attached to this car, reading, one M. C. B. coupler and one knuckle and pin repaired because the coupler was broken and the knuckle and pin lost. The bill was also accompanied by a certificate of wrong repairs signed by the Chief Joint Car Inspector of the Kansas City Joint Inspection Association, at Kansas City, Mo., stating that this car "moved from Mo. Pacific R'y to owners on January 4, 1897, with the following improper repairs covered by Pennsylvania R'y M. C. B. Association repair card applied December 21, 1896, at Glen Lock, by Thos. Donnelly," reading, "One M. C. B. coupler, knuckle and pin broken." He further says car had "one old Buckeye M. C. B. coupler and knuckle with knuckle lock and arm missing, uncoupling attachments not made operative, applied contrary to the provision of Section 4, M. C. B. Rule 5."

The P. R. R. Co. returned the bill, stating that, upon investigation, it found that when the car was received on its line the Gould coupler, knuckle and pin in car were broken and it replaced same with a new Buckeye coupler, knuckle and pin, for which it rendered bill, allowing proper credit for scrap; that the coupler it applied had been exposed to the weather and was therefore considerably rusted, but it understands that all M. C. B. couplers are interchangeable and it therefore requests that the bill be canceled; it proposes to honor bill for the cost of making the attachments operative, and believes that this should settle the matter.

The J. D. P. Co. replied, calling attention to the joint inspector's certificate of wrong repairs which is attached to the bill, and also to a letter from the acting joint inspector of the Kansas City Joint Inspection Association, which states that the Buckeye coupler removed from the car was both old in appearance and reality, evidently having done previous service; it believes that the certificate of wrong repairs attached to the bill is sufficient evidence that the coupler was not new, and that the bill is correct.

The P. R. R. Co. replied that, after a thorough investigation of the matter, it finds that the coupler applied was one of a lot purchased from the T. H. & I. R. R. Co. on November 8, 1893, and that they were exposed to the weather since that time and were rusted, but that the coupler was not secondhand and had not been in service prior to its application to this car, and it therefore again requests cancellation of the bill.

The J. D. P. Co. quotes Sections 14 and 5 of Rule 5, and asks to have the bill paid.

Further correspondence failing to settle the matter, it is referred, by mutual consent, to the Arbitration Committee for decision.

DECISION.

Under the rules, all M. C. B. couplers are interchangeable. The statement of a joint inspector is not a joint evidence statement as contemplated by the rules. A joint evidence statement requires the signature of two parties, one representing the delivering road and one the owner of the car. On account of the several statements made by the Pennsylvania Railroad that the coupler had not been used, and in the absence of a statement to the contrary by the owners, the committee is of the opinion that the bill rendered by the Jacob Dold Packing Company is in error and should be canceled. The only charge that can be made by the Jacob Dold Packing Company against the P. R. R. Co. is for the cost of making the uncoupling device operative.

ARBITRATION CASE NO. 483.

MISSOURI PACIFIC RAILWAY COMPANY

versus

NORFOLK & WESTERN RAILWAY COMPANY.

WRONG REPAIRS TO DAMAGED CARS.

On October 12, 1896, the Norfolk & Western Railway Company repaired Missouri Pacific Railway Company car 5356, and attached thereto repair card showing repairs made, as follows: "2 end sills, behind siding; 2 draft sills; 1 intermediate sill; 2 wood bumper blocks; 2 draft timbers; 1 brake rod; 1 end fascia," giving as the reason for making these repairs, "broken."

When the car arrived at the M. P. R'y repair track in St. Louis, November 3, 1896, it was inspected by the Chief Joint Car Inspector, representing the delivering road, who reports the following defects: "4 wrong queen posts; 1 wrong top brake rod, too short; 1 wrong brake chain, too long; 1 body truss rod broken; 1 top brake staff casting broken, and 2 deadwood plates gone."

The inspector adds that the deadwood plates were doubtless omitted when the wrong repairs were made by the N. & W. R'y, and no doubt the body truss rod and top brake staff casting were broken when the other damage was done, which necessitated numerous repairs.

On October 19, 1896, the N. & W. R'y Co. repaired St. L. I. M. & S. R'y Co. car 8747, and attached thereto repair card showing repairs made, as follows: "2 draft timbers; 1 spring bolster; 8 M. C. B. journal boxes; 1 center pin; 5 bolster guide bars; 2 tie bars; 4 arch bars; 4 brake shoes; 2 top side bearings; 2 draft rods repaired; 3 pairs of new 33-inch wheels on old axles; repairs made on account of parts being broken and bent; wheels with worn flanges and tread worn hollow, and 2 axles bent."

When the car arrived at the M. P. R'y repair track at St. Louis, November 4, 1896, it was inspected by the Chief Joint Car Inspector, representing the delivering road, who reports the following defects: "8 wrong oil boxes, 1-inch holes instead of 1 1/8-inch holes, and no seats for arch bars; 16 wrong oil-box bolts, 1-inch instead of 1 1/8-inch; 1 wrong sand board, pine instead of oak; 1 queen post broken; 1 wrong dead lever guide, and 1 wrong knuckle pin, too short."

The M. P. R'y Co. rendered bill, in November, 1896, against the N. & W. R'y Co., for repairs of these items, and the N. & W. R'y Co. objected to some of these items, as follows:

M. P. car 5356.—It has investigated this matter very thoroughly, and finds that the car was received without striker plates or deadwood plates on its line, and was fitted up again in precisely the same condition; it cannot admit responsibility for the body truss rod which was said to be broken, and the top brake staff bracket which was said to be broken, as these were in good shape when the car left its line, and that the delivering company is responsible.

St. L. I. M. & S. car 8747.—The oil boxes applied by it were the M. C. B. standard oil boxes for $3\frac{1}{4}$ by 7 inch journals; that it found that the old bolts were 1 inch, and the box holes were reamed out to take these same bolts, the old bolts being used again, and were the bolts that were in the trucks when the car arrived on its line; that the sand plank removed from the car was made of pine, and it made a new one and replaced it with the same material, believing it to be standard to the car; that it had plenty of oak of suitable size, and it would have been easier to have made an oak one than the pine one. In regard to the queen post having been broken, it disclaims any responsibility, as it was not broken when the car left its line, and the delivering road should be held responsible.

The M. P. R'y Co. replied that these cars were held on its repair track until the representative of the delivering line could examine them, and that as it has attached his evidence showing that the repairs were wrong, it has complied with the rules and the bill is, therefore, correct; that the fact that a pine sand board was found on car 8747 does not indicate it to be standard to the car, particularly as the sand board on the other end of car was made of oak; that it has never used pine sand boards on any of its cars, and has always demanded cards for any that may have been applied by foreign lines; that the oil boxes referred to were not M. C. B. standard pattern, although they had M. C. B. lids on them; that the repair cards show that the wrong repairs were made by the N. & W. R'y Co., and the joint evidence of the representative of the delivering line that the repairs were not properly made shows conclusively that its bill is correct, and the fact that it is rendered in accordance with Rule 5 ought to insure its prompt payment.

To this the N. & W. R'y Co. replies that it cannot pass the bill until it is corrected in accordance with its request, with the exception of the pine sand board; that it will accept the charge for an oak sand board. It claims that the oil boxes were M. C. B. standard notwithstanding the fact that they had no arch bar seats, as the latest M. C. B. boxes do not have any arch bar seats, but are plain on the top. It further claims that 1-inch bolts are M. C. B. standard for cars of 40,000 pounds capacity, and there is, therefore, no reason for furnishing defect card or making any change in its position in this matter.

Further correspondence failing to settle the matter, it is referred, by mutual consent, to the Arbitration Committee for decision.

DECISION.

This is a case of accident or wreck and the unfair usage is not disputed. The dispute is in regard to the manner in which the repairs have been made. When extensive damages occur to a car, it can readily be determined through correspond-

ence what character of repairs will be satisfactory to the owner. That the repairs were not satisfactory to the owner in this case is evident, and it is also in evidence that there was not much attempt to conform to the car owner's standards in the repairs that were made.

Attention is called to the fact that the rules provide for the use of M. C. B. standards when of dimensions which do not impair the strength of the car, in lieu of the parts forming its original construction.

It is the opinion of the committee that the bill of the Missouri Pacific Railway Company, when corrected in accordance with this provision of the rules, should be paid.

ARBITRATION CASE No. 484.

MISSOURI PACIFIC RAILWAY COMPANY

versus

LOUISVILLE, EVANSVILLE & ST. LOUIS CONSOLIDATED RAILROAD COMPANY.

DRAFT RIGGING DAMAGED. ROUGH USAGE CLAIMED.

In December, 1896, the Missouri Pacific Railway Company rendered bill against the Receivers of the Louisville, Evansville & St. Louis Consolidated Railroad Company for repairs of freight cars at various points during the month of November, 1896, accompanying the same with repair card stubs for some of the repairs and defect cards for others. The bill was returned by the L. E. & St. L. Con. R. R. Co., objecting to charges against four cars, partly on account of rough handling and partly because six journal bearings were charged against one car.

The M. P. R'y Co. acknowledged that error had been made in the case of one of these four cars, and it eliminated this from the bill, and stated that in the case of another car the repairs were necessitated by the brakes being hung too low, which makes it chargeable to the owner. This leaves the charges against two cars in dispute, i. e., L. E. & St. L. cars 2732 and 2669.

The L. E. & St. L. Con. R. R. Co. claims that the repairs to car 2732 indicated rough handling, and that these parts had been charged against this car; also, that repairs to car 2669 indicated rough handling.

The M. P. R'y Co. replied that the repairs to car 2669 were not due to rough usage, as the drawhead pulled out in ordinary switching, breaking two draft timbers and deadwood; that in regard to car 2732 the drawbar spring and follower were missing, and the repairs to the draft timbers were not due to rough usage or breakage, but were made on account of the draft timber holes being made oblong about two inches, which was the primary cause of the drawbar pulling out on the road; that the six brasses applied to this car were applied to different journals. It calls attention to the fact that the charge against this car has been corrected to include the items which were lost, but which were omitted from the original bill.

The L. E. & St. L. Con. R. R. Co. replied that the note under Rule 3, pages 13 and 14 of the Rules of Interchange, is very explicit, and that the damage to these cars indicates rough usage, and it insists that the charge for repairs to these cars should be eliminated from the bill.

The M. P. R'y Co. replied that its records at Kansas City show that the draft timbers on car 2669 were damaged, old defects, on November 4; that the same

defects existed when the car was delivered to the K. C. Ft. S. & M. R. R., on November 17; that the drawhead was then in good condition, but when the car was returned to the M. P. R'y, at Kansas City, on November 25, the drawhead was pulled out, and the car was then sent to the repair track and repairs made and charged to car owners, as per bill. It believes from this that it is evident the damage did not occur at the same time, and is not, therefore, simultaneous. In regard to car 2732, it states that it was repaired at Osawatomie, Kansas, and, as plainly stated on the repair card stub, the repairs to draft timbers were not due to rough usage, but were made entirely on account of draft timber holes being worn oblong about two inches, and that, therefore, the damage was not simultaneous with the broken drawbar, the defects being old and due to wear and tear.

The L. E. & St. L. Con. R. R. Co. replied that it could not acknowledge that these repairs did not indicate rough usage, for the following reasons:

If car 2669 was accepted from the M. P. R'y by the K. C. Ft. S. & M. R. R. it is an acknowledgment that the car was in safe condition to handle; if not, the K. C. Ft. S. & M. R. R. should have made such repairs as were authorized in Section 1 of Rule 4 at the expense of the owner; that when car was returned to the M. P. R'y by the K. C. Ft. S. & M. R. R. a defect card should have been demanded, as the existing defects formed combination which makes repairs chargeable to the delivering company. As to car 2732, it says the repairs as noted on the card are evidence of unfair usage; that if the damage was the result of bolt holes being worn oblong it had already been acknowledged by the M. P. R'y as being in safe condition to handle when accepted from the connecting lines; and, if not, the M. P. R'y Co. should have made such repairs as Section 1 of Rule 4 authorizes.

Further correspondence failing to settle the matter, it is referred, by mutual consent, to the Arbitration Committee for decision.

DECISION.

In the case of car 2669, the bill calls for repairs consisting of one draft timber, one deadwood, four deadwood bolts, six lug bolts, two span bolts and three timber bolts. The records indicate that there was no damage to drawbars or their attachments. The damage, therefore, charged for is not a combination for which charge is prohibited in the rules. The bill is, therefore, correct and should be paid.

In the case of car 2732, the repairs of this car consisted of one draft timber, one deadwood, one tail pin and key, one cast stem drawbar, two followers, one drawbar spring and ten $\frac{3}{4}$ by 18-inch bolts. The drawbar and attachments were lost and apparently the draft timber and deadwood were damaged. The burden of proof that this was not a combination rests with the party doing the damage. It has not shown that the damage to draft timber was not accompanied by simultaneous damage to either the couplers or drawbars, drawbar springs, drawbar pockets or their substitutes or followers, and is therefore not entitled to make bill, and this charge should be withdrawn.

In both cases the argument is raised that the draft timbers were both damaged before the final damage, necessitating repairs, was done. It is the duty of all roads to give foreign cars the attention necessary to put them in safe hauling condition, and in case of breakage or damage resulting from neglect of this, such neglect will not relieve the road from responsibility for damage which it claims would not have occurred if the car had been repaired at the proper time.

ARBITRATION CASE No. 485.

DENVER & RIO GRANDE RAILROAD COMPANY

versus

UNION PACIFIC SYSTEM.

NARROW-GAUGE CAR DRAFT RIGGING DAMAGED AND CARDED.

In April, 1897, the Denver & Rio Grande Railroad Company rendered bill against the Union Pacific Railway Company for repairs to numerous D. & R. G. cars in the months of October and November, 1896, and January, February and March, 1897, accompanying same by defect cards issued by the Union Pacific System. The bill contained charges for repairs of what are called "spring planks" on D. & R. G. narrow-gauge cars. These spring planks consist of planks extending across the entire width of the car in the plane of the underframing and outside of the end sills, being made of two pieces of oak, $2\frac{1}{4}$ by 8 inches, and one piece of oak, $4\frac{1}{2}$ by 8 inches, all the length of the end sill. The drawbar casting is attached to this timber, and the drawbar stem passes through it and then through a rubber washer 2 inches thick by 6 inches diameter, which is placed between the spring plank and the end sill, and passes on through the end sill and another rubber spring or washer back of the end sill, where it is fastened by a nut.

The U. P. R'y System objected to the charges for repairs to these spring planks, which, it says, are similar to deadwoods, and claims that the breakage or damage of these spring planks or deadwoods should not be regarded as unfair usage.

The D. & R. G. R. R. Co. replied that the bills are based on defect cards given by the U. P. inspector, and therefore is an acknowledgment of their responsibility for the damage sustained by these cars; that up to this time it has paid such bills for a number of years, and submits blue print showing the construction of the narrow-gauge damaged cars, and how the broad-gauge cars switching in connection with them will strike this spring plank if the proper push bar is not used, on account of the great variation in the height of the two drawbars from the top of the rail, the drawbar of the broad-gauge car passing spring plank of the narrow-gauge car and to one side of the drawhead of that car; that the hose is frequently cut off and the train-pipe broken by such switching, and that the U. P. System acknowledges responsibility for such damage.

The U. P. System takes the position that the damage should be called fair usage for the following reasons:

First.—Under the provisions of Section 48, Rule 3, it is relieved of responsibility because there was no combination of damage indicating rough usage, under the Rules of Interchange.

Second.—That these cars were damaged by being switched on a third-rail track in connection with broad-gauge cars; that the damage to deadwoods was caused by the narrow-gauge cars being pushed against the broad-gauge cars in process of switching without being coupled, and in this way the drawbars of the broad-gauge cars pass to one side of the drawbars on the narrow-gauge cars, and oftentimes the coupling link on a broad-gauge car splits the spring plank on the narrow-gauge car. It claims that the cars are handled as carefully as similar switching is done on the

D. & R. G. road with broad and narrow gauge cars together, and that all possible care is taken.

Regarding the defect cards on authority of which this bill has been made, it states that the cards were issued by an ex-joint car inspector at Denver, who was inclined to make decisions contrary to the M. C. B. Rules, and that as a matter of fact the U. P. System issued these cards under protest.

The cards themselves do not contain any statement that they were issued under protest.

Failing to settle the matter, it is referred, by mutual consent, to the Arbitration Committee for decision.

DECISION.

The joint inspector was the representative of the Union Pacific Railroad, and it is proper to suppose that when the cards were issued he had such information as to warrant him in issuing the same.

In the opinion of the committee the bills of the Denver & Rio Grande Railroad Company are correct and should be paid.

ARBITRATION CASE No. 486.

SOUTHERN PACIFIC COMPANY

versus

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS RAILWAY COMPANY.

SCRAP CREDIT. KIND OF SCRAP TO BE CREDITED.

On January 31, 1897, the Cleveland, Cincinnati, Chicago & St. Louis Railway Company rendered bill against the Southern Pacific Company for repairs of cars during January, 1897, as per Rule 3, with statement attached and accompanied by repair card stub calling for "One Janney coupler on S. P. car 19049 on account of coupler head broken in pin hole."

The bill was returned by the S. P. Co., calling attention to the credit for the scrap drawbar, and stating that its cars were equipped with California couplers, and it should be allowed at least 180 pounds cast steel scrap credit, as this is the material of which the body is made, and that the C. C. C. & St. L. R'y Co. had only allowed credit for 166 pounds malleable scrap. The S. P. Co. at the same time returned another bill asking for a credit of 180 pounds of steel scrap in place of 170 pounds.

The C. C. C. & St. L. R'y Co. again presented the bills, calling attention to Arbitration Case No. 420, and stating that the bills were correct as per that arbitration case.

The S. P. Co. replied that it did not think Arbitration Case 420 is a parallel one, as in that case the same make of coupler was removed as the one applied, while in this case the C. C. C. & St. L. R'y Co. removed a California coupler from one car and applied a Janney coupler, and removed a California coupler from another car and applied a Gould coupler; that the couplers removed were both steel, while the couplers applied were both malleable iron; that if Arbitration Case 420 is considered a similar case it would place the users of steel couplers at a great disadvantage over

the users of malleable couplers; it believes that the bills should be corrected so that one bill will make a net charge of \$4.15 and the other a net charge of \$6.65.

The C. C. C. & St. L. R'y Co. examined the matter fully and finally deducted \$1 from one of the bills, making it read \$5.93 instead of \$6.93, the correction being made to allow credit for the good parts removed; it still insists, however, that the credits allowed for scrap are correct as per Arbitration Case 420.

Further correspondence failing to settle the matter of proper credit for scrap in these bills, it is referred, by mutual consent, to the Arbitration Committee for decision.

DECISION.

This case is similar to Case 420 in so far as the amount of credit to be allowed is concerned; that is, it should be equal to the weight of the Janney bar applied; but as the couplers removed were cast steel, the price of the material credited should be that allowed for this material.

ARBITRATION CASE NO. 487.

CHICAGO & SOUTH BEND RAILROAD COMPANY

versus

CHICAGO, BURLINGTON & NORTHERN RAILROAD COMPANY.

SILL STEP BROKEN; CHARGED TO CAR OWNER.

In May, 1897, the Chicago, Burlington & Northern Railroad Company rendered bill against the Chicago & South Bend Railroad Company for repairs to freight cars as per M. C. B. Rule 4, in the month of April, 1897, for one sill step applied to C. & S. B. car 136, 6 pounds wrought iron and ½ hour labor, 28 cents, less credit for 6 pounds wrought-iron scrap, 4 cents; net amount of bill, 24 cents. The bill was accompanied by a repair card stub stating that this sill step was replaced because it was broken.

The C. & S. B. R. R. Co. returned the bill and asked to have it canceled because the sill step could not be broken by fair usage.

The C. B. & N. R. R. Co. replied that it had no record of the car having unfair usage and presents the bill for payment again.

The C. & S. B. R. R. Co., however, maintains its position that a sill step could not be broken by fair usage, and further correspondence failing to settle the matter, it is referred, by mutual consent, to the Arbitration Committee for decision.

DECISION.

There is nothing in this correspondence to show that this car had been derailed or wrecked or had received unfair usage in any manner. In the opinion of the committee the bill of the Chicago, Burlington & Northern Railroad Company is correct and should be paid.

ARBITRATION CASE NO. 488.

CINCINNATI, NEW ORLEANS & TEXAS PACIFIC RAILWAY COMPANY

versus

CANDA CATTLE CAR COMPANY.

AIR HOSE CHARGED REPEATEDLY AGAINST SAME CAR.

In March, 1897, the Cincinnati, New Orleans & Texas Pacific Railway Company rendered bill against the Canda Cattle Car Company for repairs to cars during the months of February and March, 1897, including therein three charges for air hose applied to car 2094, each covered by a repair card stub, the first dated March 2, the second March 17, and the third March 24.

The Canda Cattle Car Co. returned the bill, calling attention to the fact that these three repair card stubs each showed an air hose applied to car 2094 on account of hose being bursted, and to the fact that the first hose was applied on March 2, the second March 17, and the third March 24, and it believes from these facts that the owner is not responsible for any of them, because, first, they did not fail under fair usage, and second, that the hose which the C. N. O. & T. P. R'y applied was either secondhand or worn out when applied or the goods was of poor quality and unfit for service.

The C. N. O. & T. P. R'y Co. replied that it finds from the movement of the car, that it was off its line between each of the applications of hose; it admits that three hose in one month appears to be a large number, but it does not see why, under the circumstances, it should not charge for them, as the replacing was made strictly in accordance with the rules, and the cause was in no instance due to unfair usage on its part.

The Canda Cattle Car Co. returned the bill, stating that it could not entertain it in its present shape; that the rules require a repair card should be attached each time a hose is applied from any cause; that car 2094 bears no card of any other road than the C. N. O. & T. P. R'y Co. for a hose, and it therefore believes that no hose failed except those applied when on the line of the C. N. O. & T. P. R'y, and that no hose was applied except such as was applied by that company; that it took the matter up with the road on which the car was between the dates of application of hose by the C. N. O. & T. P. R'y and received reply that no hose was applied to the car while in such service.

Further correspondence failing to settle the matter, it is referred, by mutual consent, to the Arbitration Committee for decision.

DECISION.

The failure of hose in service may or may not be due to fair usage and therefore may or may not be chargeable to the car owner. It is not evident how three hose can be charged to one car within twenty-two days and come under the heading of fair usage. The only explanation offered is that the improper hose may have been applied while the car was on some other railroad company's lines. This argument cannot be accepted. It is evident some irregular work has been practiced in connection with the hose charge under consideration.

In the opinion of the committee the charge for hose should be confined to one hose on either end of the car to which a hose was applied during this time.

ARBITRATION CASE No. 489.

CHICAGO GREAT WESTERN RAILWAY

versus

KANSAS CITY, FORT SCOTT & MEMPHIS RAILROAD COMPANY.

WRONG KNUCKLE USED AND CARDED.

In February, 1897, the Kansas City, Fort Scott & Memphis Railroad Company rendered bill against the Chicago Great Western Railway, including therein a charge of \$2.50 for one Buckeye knuckle applied to M. K. & T. R'y box car 10060 upon a defect card of the C. G. W. R'y dated December 30, attached to this car, reading: "One Gould knuckle in place of Little Giant Buckeye."

The C. G. W. R'y returned the bill, objecting to the charge for Buckeye knuckle in place of Gould, for the reason that it considers the Gould knuckle which it applied to the car is worth as much to the K. C. Ft. S. & M. R. R. people as it had charged when applying the same; that it considers that a labor charge for changing the knuckle only should be made.

The K. C. Ft. S. & M. R. R. Co. replied that a Gould knuckle in a Buckeye coupler is inoperative, as the tongue of the Gould knuckle does not come in the right position to make the coupling safe, and that it made bill against the C. G. W. R'y because it found a defect card of that company on the car, which it understands is correct; that the M. K. & T. R'y runs into Kansas City over its lines from Paola, and that the C. G. W. R'y does the work of the M. K. & T. R'y at that point, and states that it is customary under the rules, when a foreign knuckle is found, to make a bill for the proper knuckle, giving credit for the one removed, as scrap, and that it could not use the secondhand Gould knuckle in repairing foreign cars; it calls attention to the fact that the new rules authorize no labor charge for replacing a knuckle.

The C. G. W. R'y replied that it had billed against the owner of the car for one Gould knuckle, \$2.80, less one scrap Buckeye knuckle, or a net charge of \$2.53, this bill having been made before a replacement price was listed for the Buckeye knuckle, and it does not understand why the scrap value only is allowed for a perfectly good knuckle, and refers to Arbitration Case 393.

Further correspondence failing to settle the matter, it is referred, by mutual consent, to the Arbitration Committee for decision.

DECISION.

This is a case of wrong repairs. The Kansas City, Fort Scott & Memphis Railroad claims the Gould knuckle is worth only scrap to it. If the Chicago Great Western Railway Company chooses to make wrong repairs to a foreign car it is not in position to dictate how the wrong material shall be disposed of when removed for the purpose of making standard repairs.

The position of the Kansas City, Fort Scott & Memphis Railroad is sustained.

ARBITRATION CASE No. 490.

RUTLAND RAILROAD COMPANY

versus

MICHIGAN CENTRAL RAILROAD COMPANY.

DRAWBAR CHARGED, ACCOUNT DRAWBAR STRAP AND BOLTS BROKEN.

In March, 1897, the Rutland Railroad Company rendered bill against the Michigan Central Railroad Company for repairs to M. C. car 4126 on March 15, as per repair card stub attached. The stub called for "One drawbar applied, 2 bolts 18 by $\frac{7}{8}$ inches, one bolt 13 by $\frac{7}{8}$ inches." The reason for the work being done was drawbar strap broken, bolts broken. The bill charged for:

3 hours' labor, 20 cents.....	\$.60
53 pounds wrought iron, 3 cents	1.59
180 pounds cast iron, $1\frac{1}{2}$ cents.....	2.70
	<hr/>
<i>Credit.</i>	\$4.89
53 pounds wrought iron, $\frac{3}{4}$ cent	\$.40
180 pounds cast iron, $\frac{1}{2}$ cent.....	.90
	<hr/>
	\$3.59

The M. C. R. R. Co. returned the bill, stating that if the drawbar strap was broken no charge should be made for the drawbar, and asks to have the bill corrected.

The Rutland R. R. Co. replied that it considers it proper under the rules to charge for the drawbar when it is necessary to remove the same on account of defect to the drawbar strap; that the drawbar and strap are riveted together and form practically one article; that either cannot be removed without the other, and when removed they cannot be separated without considerable additional expense not contemplated by the rule allowing two hours for removing and replacing drawbar; it states that it does not think the exact location of the damage is material, providing it is such as to render the entire article unfit for use; it believes it has allowed full credit for all the material removed and can see no reason why the bill should not be accepted.

The M. C. R. R. Co. again returned the bill, stating that if the Rutland R. R. Co. found it more economical to remove both the drawbar and the drawbar strap when only the strap was broken, it would make no objections if the proper charges and credits are made; that the bill has charged 180 pounds cast iron at $1\frac{1}{2}$ cents per pound, and allowed credit for 180 pounds cast iron in the good drawbar removed at $\frac{1}{2}$ cent per pound, and yet admits that the drawbar was not broken; it does not object, however, to the charge as made for labor if the Rutland R. R. Co. will allow an additional credit of \$1.80 on the bill on account of the good drawbar removed.

Further correspondence failing to settle the matter, it is referred, by mutual consent, to the Arbitration Committee for decision.

DECISION.

A railroad company in repairing a foreign car is not justified in scrapping a good drawbar from a foreign car because it is more convenient or cheaper to it to do so, and the M. C. B. Rules of Interchange do not confer such a privilege.

The position of the Michigan Central Railroad is sustained.

ARBITRATION CASE No. 491.

MISSOURI PACIFIC RAILWAY COMPANY,

versus

ROCK ISLAND & PEORIA RAILWAY COMPANY.

WRONG REPAIRS. PROPER CHARGE FOR CORRECTING.

In May, 1897, the Missouri Pacific Railway Company rendered bill against the Rock Island & Peoria Railway Company for repairs to St. L. I. M. & S. R'y car 5367, at St. Louis, in May, 1897, as per joint evidence card attached; amount of bill, 72 cents. The joint evidence card certified that the car was received by the M. P. R'y from the East St. Louis Connecting R'y with improper repairs — two oil-box bolts, $1\frac{1}{2}$ by 17 inches, should be $1\frac{1}{4}$ by 15 inches — and with a repair card of the R. I. & P. R'y attached, which also accompanied the bill, and which stated that the repairs made by it consisted in applying two $1\frac{1}{4}$ by 17 inch oil-box bolts, as they were broken in removing wheels. The joint evidence card is signed by John Collins, Foreman, Mo. Pac. R'y, and M. H. Halbert, A. J. C. Inspector.

The bill was returned by the R. I. & P. R'y with the statement that it could not consider this as wrong repairs; that the bolts applied were the same size as those removed, and that there is no way of telling just what length the bolts should be.

The M. P. R'y Co. still pressed the bill for payment, and stated that the repairs to this car were not made in a proper manner and that the joint evidence card carries with it ample authority to render bill against the company making the wrong repairs, and as the attached joint evidence card shows that the wrong repairs were made by the R. I. & P. R'y Co., it is a proper charge against that company.

Further correspondence failing to settle the matter, it is referred, by mutual consent, to the Arbitration Committee for decision.

DECISION.

This is a case where the repairs should have been properly and neatly made, as it only required cutting two inches off the box bolts to make a workmanlike job. The proper charge for correcting this improper work, however, will be the cost of cutting off the box bolts to the proper length, and a bill made out on this basis by the Missouri Pacific Railway Company should be paid by the Rock Island & Peoria Railway Company.

ARBITRATION CASE No. 492.

TERRE HAUTE & INDIANAPOLIS RAILROAD COMPANY

versus

NEW YORK, CHICAGO & ST. LOUIS RAILROAD COMPANY.

COUPLER BODY CHARGED TO CAR OWNER TO OFFSET BILL OF ANOTHER ROAD.

The Terre Haute & Indianapolis Railroad Company rendered bill against the New York, Chicago & St. Louis Railroad Company for one Gould coupler body applied to N. Y. C. & St. L. R. R. car 10112, on March 12, 1896, amount \$5, which bill was declined by the N. Y. C. & St. L. R. R. Co.

The T. H. & I. R. R. Co. argues as follows:

"On May 15, 1897, we issued bill No. 1918 against the N. Y. C. & St. L. R. R. Co., in the amount of \$5 for one Gould coupler body applied to N. Y. C. & St. L. R. R. car 10112 to offset bill No. 29592 of the C. & A. R. R. Co. against the T. H. & I. R. R. Co., based on I. I. & I. R. R. Co. bill No. 10966. The car was received by the Vandalia Line from the N. Y. C. & St. L. R. R. Co., at Hibbard, on March 8, 1896, with a record of one cracked center sill. It was delivered by the Vandalia Line to the Mo. Pacific R'y at St. Louis, March 12, 1896, with coupler cracked. April 14, 1896, a defect card was issued against the C. & A. R. R. at Dwight, Ill., for one coupler chipped on guard arm. Reference to the East St. Louis terminals by the C. & A. R. R. showed the car to have been delivered to the Mo. Pacific R'y with coupler cracked as stated, and received by the C. & A. R. R. in that condition. On the presumption that the crack in coupler was the cause of chip, the joint inspector at East St. Louis issued defect card No. 3880 against the Vandalia Line and in favor of the C. & A. R. R. Co. on this record.

"Under the Articles of Agreement of the New Interchange Association in effect September 1, 1895, the cracked coupler was an owner's defect, and all intervening roads of the St. Louis terminals concur in the opinion that the chipped and cracked coupler was one and the same defect, also concurred in by the Chief Joint Inspector at East St. Louis. After a thorough investigation a defect card was issued against the delivering road and to the Chicago & Alton Railroad. The delivering road in this case, the Vandalia Line and the owner of the car, the N. Y. C. & St. L. R. R. Co. were parties to the New Interchange Agreement, while the receiving road, the Chicago & Alton R. R., was not a party to this agreement. According to the fourth clause on page 5 of that agreement, we considered that we were entitled to reimbursement by the car owner and accordingly billed against them in the same amount as the C. & A. R. R. billed against us on the defect card issued in their favor. The car received no rough usage. The damaged coupler was clearly an owner's defect, as these facts were certified to by a disinterested joint inspection bureau."

The N. Y. C. & St. L. R. R. Co. argues as follows:

"The car being delivered to the T. H. & I. R. R. without defects, and being delivered by the T. H. & I. R. R., to a railroad company not in the Interchange and no defect card demanded at that time, showed that the defects did not exist on the car when delivered by the T. H. & I. R. R. to the Mo. Pacific R'y on March 12. We claim that the damage to the coupler was not an owner's defect, it being beyond the limits of cracked or chipped couplers, and we further claim that had this defect been an owner's defect, that the I. I. & I. R. R., which was then a member of the Chicago Agreement, would not have demanded a card from the C. & A. R. R. Further, that there were no dimensions given of the defect until the car is offered to the owner, at Knox, by the I. I. & I. R. R. It was there found that the defect was beyond the limits and defect card was demanded from the I. I. & I. R. R., which was issued, this railroad making a bill against the I. I. & I. R. R. for the cost of changing the bar."

The above statements are signed by both parties, and it is submitted to the Arbitration Committee for decision.

DECISION.

This is a case coming under the M. C. B. Rules of September 1, 1895. The arguments bearing on what is known as the New Interchange (Chicago) will not be considered. There is nothing in the M. C. B. Rules of 1895 that justifies one railroad company charging another railroad company for drawbars broken or changed while on a foreign road. An effort to get such a rule incorporated into the rules in June, 1895, was attempted, but failed.

In the opinion of the committee, the T. H. & I. R. R. Co. has no claim under the M. C. B. Rules against the N. Y. C. & St. L. R'y Company.

NOTE.—*Mr. Muckenzie being interested in this case, was not a party to this decision.*

ARBITRATION CASE NO. 493.

CHICAGO GREAT WESTERN RAILWAY COMPANY

versus

CANDA CATTLE CAR COMPANY.

TRUSS RODS WELDED AND CHARGED TO OWNER.

On May 31, June 30, and August 31, 1897, respectively, the Chicago Great Western Railway Company rendered bills against the Canada Cattle Car Company for various repairs to the latter Company's cars, accompanying the same with repair card stubs showing why the repairs were made. Included in these bills were charges for welding six truss rods at 60 cents each for labor, in the first bill; welding five truss rods at 60 cents each for labor in the second bill, and welding one truss rod at 40 cents for labor in the third bill. The repair card stubs showed that these rods were welded because they broke.

The Canda Cattle Car Company returned the bills in each case, stating that it could not consent to pay bills for welding truss rods; that truss rods would not break under fair usage.

The C. G. W. R'y Co. replied in each case that it could not cancel these charges because the cars had nothing else the matter with them except that the truss rods broke; that the cars had not been maltreated in any way; and it considers, therefore, that they failed under fair usage and are properly chargeable to the car owner. It asked the Canda Cattle Car Co. to return all the papers in order that it might place the matter before the Arbitration Committee.

The Canda Cattle Car Co. replied that it operates 2,500 cars in all sections of the United States, Mexico and Canada, and that no other company renders bills against it for broken truss rods, and it therefore believes that if they failed on the C. G. W. R'y it is due to some unusual treatment of the cars, and it adds that it is as ready and willing as anyone to conform to the M. C. B. rules, but that if the C. G. W. R'y Co. insists upon placing this matter before the Arbitration Committee, it gives notice that it will not be bound by the decision.

The C. G. W. R'y Co. therefore refers the matter to the Arbitration Committee, and states that the Canda Cattle Car Company claims that it is not possible for the rods to break under fair usage, and inasmuch as the C. G. W. R'y Co. has no record

of the cars in question being subjected to unfair usage, it desires to have the matter referred to the Arbitration Committee for decision.

DECISION.

It is not unusual for truss rods to break in freight car service under what is termed fair usage and for which the owner is responsible. In the opinion of the committee the bill of the C. G. W. R'y Co. is correct and should be paid.

ARBITRATION CASE No. 494.

BALTIMORE & OHIO RAILROAD COMPANY

versus

CHESAPEAKE & OHIO RAILWAY COMPANY.

BRAKE BEAM MISSING INCLUDES ATTACHMENTS THERETO.

In April, 1897, the Baltimore & Ohio Railroad Company made bill against the Chesapeake & Ohio Railway Company for the labor of renewing brake beam on C. & O. R'y car 4674, on account of same being lost, and also included charge for renewing brake shoes and heads.

The C. & O. R'y Co. objected to the charge for shoes and heads, claiming that when brake beams and connections are lost, shoes and heads are necessarily lost, and charge should be made only for labor.

The B. & O. R. R. Co. takes the ground that the clause in the M. C. B. Rules provide that labor only shall be charged in renewing brake beams, and makes no mention of brake shoes and heads, and while it formerly took the same view as held by the C. & O. R'y Co., yet, on finding that most roads were construing the rule to mean that labor should be charged on brake beams missing and full charge made for renewing shoes and heads, it was forced to assume the same position.

As it is a point that should be definitely settled, both roads came to a friendly agreement to submit the case to the Arbitration Committee for decision.

DECISION.

The question at issue in this case is whether Section 6 of Rule 5 would allow charge for labor only for replacing brake beams, and a charge for material and labor for replacing the brake shoes and heads attached to the same.

The brake beam is only complete when it has the heads and shoes attached. A coupler cannot be considered complete unless it has the hook, locking attachments, etc., complete, and it would be as reasonable in making charge for replacing couplers under the rule, to charge for labor of replacing coupler and for the cost of material and labor for the hook, locking device, etc., as to charge for the labor of replacing brake beam, and the material and labor for replacing the heads and shoes.

In making bill for replacing brake beams lost on the line of the company making the repairs, in accordance with Section 6 of Rule 5, the proper charge is the labor for replacing the brake beam with the heads and shoes complete.

ARBITRATION CASE NO. 495.

UNION PACIFIC SYSTEM

versus

MISSOURI, KANSAS & TEXAS RAILWAY COMPANY.

KNUCKLE LOCKS CHARGEABLE UNDER THE RULES.

The Union Pacific System rendered various bills against the Missouri, Kansas & Texas Railway Company for labor applying knuckle locks to M. K. & T. R'y cars, charging for $\frac{1}{2}$ hour labor for applying knuckle locks on various occasions in May and July, 1897, on various M. K. & T. R'y cars.

The M. K. & T. R'y objected, stating that no charge should be made for applying knuckle locks, for the reason that Arbitration Case No. 433 prohibits charging for labor applying knuckle pins, and it considers the application of knuckle locks should come under the same ruling. It also claims that no more time is required to replace a knuckle lock than is required to replace a knuckle pin, and it is therefore reasonable to suppose that there should be no charge for labor.

The Union Pacific System replied that inasmuch as it takes at least $\frac{1}{2}$ hour labor to apply a knuckle lock, and in some cases $\frac{1}{4}$ to $\frac{1}{2}$ hour longer, that the charge for the labor should be made; that Section 40, Rule 3, provides that locks, grain doors, and all inside or concealed parts of cars missing or damaged in fair usage, and failure or loss under fair usage of any part of the body of car, except as provided for in Section 5, Rule 6, can be repaired at the expense of the owner, and under this rule it claims authority to make charge for the labor expended in renewing defective knuckle locks.

It is referred, by mutual consent, to the Arbitration Committee for decision.

DECISION.

The rules make car owners chargeable with cost of repairs to any part of their cars failing or lost under fair usage, except as provided for in the exceptions, and as knuckle locks are not included (nor mentioned) in any of the exceptions, they are chargeable under the general rule.

In the opinion of the committee the half hour labor charged by the Union Pacific Railway for renewing knuckle locks is correct and should be paid.

ARBITRATION CASE NO. 496.

CHICAGO & EASTERN ILLINOIS RAILROAD COMPANY

versus

SOUTH-EASTERN LINE.

M. C. B. STANDARD JOURNAL BOX USED.

On March 29, 1897, the Chicago & Eastern Illinois Railroad Company applied one M. C. B. oil box to South-Eastern Line car No. 9079, at Terre Haute, Ind., account of "oil box broken." The S.-E. Line rendered bill against the C. & E. I. R. R. Co. for replacing the oil box, as follows:

Repairs to S.-E. L. car 9079 as per M. C. B. Rule 5, Section 5:

1 oil box, 90 pounds.....	\$1.35
Labor, 2 hours.....	.40

\$1.75

Credit.

1 wrong oil box, 84 pounds42
----------------------------------	-----

\$1.33

claiming that the repairs were wrong, and attaching joint evidence signed by E. M. Roberts, Master Mechanic of South-Eastern Line, and J. Shrimpton, Chief Joint Inspector of Alabama Railways.

Mr. Roberts claimed as follows: "As this box is not proper to the car on account of not having lips for the arch bars, we consider that it is not equal in strength, or in conformity with the original construction; therefore, it is not in accordance with Rule 4, Section 5. We claim the right to change the oil box applied and bill the cost of same to the C. & E. I. R. R. Co. in accordance with Rule 5, Section 5."

Mr. Shrimpton claimed that the oil box was wrong "from the fact that it does not conform in detail to the original construction; all other boxes on the car are provided with a seat to receive $3\frac{1}{4}$ -inch arch bars. This box in question has no seat. The top of the box is a perfectly plain surface. On this account I claim it impairs the strength of the truck, in lieu of the box forming its original construction."

The C. & E. I. R. R. Co. claimed that the only objection to the oil box being on account of the absence of lugs at the sides of the arch bar, should not condemn the box, for the reason that it is strictly M. C. B. standard without the lugs, which it cannot be justly claimed impairs the strength. It is further claimed by the C. & E. I. R. R. Co. that the evidence of impaired strength was not confirmed by the failure of the oil box in any particular, and that the M. C. B. Association, in adopting the box as standard, acknowledged its fitness and strength, and that if any M. C. B. oil box could have been used to replace the broken box on S.-E. L. car 9079, this one could have been, without question.

Failing to agree, after considerable correspondence, it has been decided best to submit the case to the Arbitration Committee of the M. C. B. Association for settlement, the representatives of Car Department of both roads agreeing and signing this abstract.

DECISION.

The only ground upon which the South-Eastern Line justifies its bill for changing the oil box to that standard to the car is on account of the box used by the C. & E. I. R. R. Co. in repairing the car not having lips for the arch bars, and therefore, not being equal in strength to the original construction.

The standard boxes of the M. C. B. Association have no such lugs on the top; it is, therefore, clear that the members of the Association do not consider that the lugs on the top of the box are necessary for proper strength, and it is the opinion of the Arbitration Committee that the bill should be withdrawn.

ARBITRATION CASE NO. 497.

NELSON MORRIS & COMPANY,

versus

CENTRAL RAILROAD COMPANY OF NEW JERSEY.

WRONG REPAIRS TO DAMAGED CARS.

Nelson Morris & Company rendered a bill of \$12.24 against the Central Railroad Company of New Jersey for repairs done to Morris Refrigerator Line car 6092 in the month of September, 1896. This car was received by Nelson Morris & Co. on September 4, 1896, from the New York, Chicago & St. Louis R. R. Co. at Chicago, bearing plain evidence of having recently been wrecked and repaired. Joint inspection with the delivering road's inspector showed the following defects: Two wrong framed draft timbers; 2 filling blocks missing; 2 tie rods and 7 brace rods broken; 2 sub-sill bolts, $\frac{3}{4}$ by 12 inches, missing; 12 $\frac{3}{4}$ by 6 lug bolts, should be $\frac{7}{8}$ by 7 inches; 2 floor pans damaged; 4 drip pipes loose; 8 $\frac{1}{2}$ -inch truss rod lag screws should be $\frac{3}{4}$ inch; 2 $\frac{3}{8}$ -inch key bolts, should be $\frac{1}{2}$ inch.

There was no M. C. B. repair card attached to indicate where the repairs had been done. Nelson Morris & Co. therefore requested the delivering road to furnish M. C. B. defect card to cover the defects mentioned.

The N. Y. C. & St. L. R. R. Co. traced the car and found that it was wrecked while in the possession of the C. R. R. Co. of N. J., and that it was repaired at its Elizabethport shops; that it had not been in trouble while in the possession of the N. Y. C. & St. L. R. R. Co., nor while in the hands of the intermediate roads en route home.

Nelson Morris & Co. rendered the bill in question on the authority of the inspector's joint evidence as per M. C. B. Rule 5, Section 5.

The C. R. R. Co. of N. J. declines all responsibility, and claims car had been properly repaired according to M. C. B. Rule 15, page 26, 1895 rules, and further states that car was delivered to L. V. R'y August 21, 1896, in good condition.

As the car in question was received home under the rules in effect September 1, 1896, Nelson Morris & Co. is of the opinion that its bill is proper.

DECISION.

The evidence in this case is conclusive that wrong repairs had been made. The Central Railroad of New Jersey, which repaired the car after wrecking it, presents no evidence to show that repairs were made elsewhere.

In the opinion of the committee the Central Railroad of New Jersey should pay Nelson Morris & Company's bill.

ARBITRATION CASE NO. 498.
SOUTHERN PACIFIC COMPANY (PACIFIC SYSTEM)

versus

CHICAGO & SOUTH BEND RAILROAD COMPANY.

DRAFT RIGGING REPAIRED. ROUGH USAGE NOT INDICATED.

In April, 1897, the Southern Pacific Company (Pacific System) rendered bill against the Chicago & South Bend Railroad Company for repairs of C. & S. B. cars 104 and 105, as per M. C. B. Rules, attaching repair card stubs to the bill specifying fully the repairs made, and the reason for same, which were as follows:

Car No. 104.

1 California coupler.....	\$11.25	
1 drawbar stem, 23 pounds.....	.69	
8 bolts and nuts, 22 pounds .....	.66	
2 hours' labor.....	.40	
		<hr/>
		\$13.00

Credit.

Janney coupler casting.....	\$2.25	
“ knuckle	3.25	
“ lock pin.....	.30	
“ knuckle pin .....	.15	
45 pounds wrought scrap .....	.34	
		<hr/>
		6.29

Net amount of charge.....	\$6.71
---------------------------	--------

The repair card stubs show that this car received the above repairs on account of Janney coupler broken, stem cracked and bolts broken.

Car No. 105.

1 drawbar spring, 36 pounds	\$1.26	
1 drawbar follower, 21 pounds.....	.63	
1 bolt and nut, 1½ pounds.....	.05	
2 hours' labor.....	.40	
		<hr/>
		\$2.34

Credit.

36 pounds steel	\$0.36	
23 pounds wrought .....	.17	
		<hr/>
		.53

Net amount of charge.....	\$1.81
---------------------------	--------

The repair card stub shows that this car received the above repairs on account of one drawbar spring, one follower and one jaw bolt broken.

The bill was returned by the C. & S. B. R. Co. objecting to the charges, claiming the damage, as shown by the repair card stubs attached, indicated unfair usage, according to Rule 3, Section 48.

To this the S. P. Co. replied, that according to the note following Section 48 of Rule 3, there was no combination indicating unfair usage, as in the case of car 105 drawbar spring and follower were broken, the note referred to reading: “ Drawbars

or drawbar springs, accompanied by simultaneous damage to either drawbar stops and attachments, carrier irons, filling blocks, draft timbers or their substitutes, or end sills, shall be considered as caused by unfair usage"; that none of the simultaneous damage indicating unfair usage existed.

In the case of car 104 a Janney coupler and drawbar stem only were broken. Under the above section, no combination indicating unfair usage existed.

The C. & S. B. R. R. Co. replied that the S. P. Co. does not go far enough in the interpretation of the rule applicable to this case, as it makes no mention of the jaw bolt broken on car 105, and which, according to its understanding, completes the combination, as it considers the jaw bolt a drawbar stop attachment. Also, in regard to the eight bolts used in repairs of car 104, which it considers forms a combination indicating rough usage.

The S. P. Co. again returned its bill and referred to Arbitration Committee decision 408, in which it is decided that damage to bolts does not form a combination, and claimed that the case in question, in its opinion, is a similar one, and that the charge is correct.

To this the C. & S. B. R. R. replied that it did not consider Case 408 at all similar, as in that case it was stated that carry iron bolts were broken, and in the case in dispute it is drawbar stops and attachments; that in case of car 104 it is evidence of rough usage when a coupler and stem and two jaw bolts and six lug casting bolts (which are used to attach the lug casting to the draft timber) are broken.

The S. P. Co. replied to this that it is still of the opinion that Case 408 is similar, and should govern in the case in dispute, as drawbar stop bolts cannot be considered as a drawbar stop attachment, as referred to in note above cited, and should be considered the same as a carry iron bolt, as they are no more a portion of the drawbar stop than a carry iron bolt is of the carry iron, but are used for a similar purpose in both cases, and therefore do not form a combination. The damage, therefore, must be considered as occurring under fair usage, as there was no accident to these cars while on the S. P. Co's lines.

Failing to settle the matter, all correspondence is referred to the Arbitration Committee for a ruling.

DECISION.

In Arbitration Case No. 407 the committee decided that a tail strap was a drawbar attachment, and when broken simultaneously with the drawbar it was unfair usage. The committee, at its meeting, May 18, 1897, reversed that decision (see note, page 2), holding that drawbar attachments referred to in note to Section 48, Rule 3, were attachments to drawbar stops *only*, and not pockets, spindles or followers.

As no simultaneous damage occurred, in the meaning of the rules, to indicate unfair usage, the bill of the Southern Pacific Company is correct, and should be paid.

ARBITRATION CASE No. 499.

IOWA CENTRAL RAILWAY COMPANY

versus

CHICAGO, MILWAUKEE & ST. PAUL RAILWAY COMPANY.

JOURNAL BEARING, SOLID-LINED OR SHELL.

The Iowa Central Railway Company rendered bill against the Chicago, Milwaukee & St. Paul Railway Company for journal bearings applied to C. M. & St. P. R'y cars, charging them as solid-lined bearings at 11 cents per pound.

The C. M. & St. P. R'y Co. objected to the charges, claiming that the bearings applied are properly filled shelled bearings, and should be charged at 8 cents per pound as provided in the M. C. B. Rules for such bearings.

The Iowa Central R'y claimed that the journal bearings used in this case are solid-lined bearings, for the reason that the brass metal constitutes the greater part of the wearing body of such bearings, and that it is not intended the bearings shall be removed from the journal as soon as the lining is gone, as is necessary with what is ordinarily called filled shelled bearings; but on the contrary, these bearings are supposed to wear directly on the brass until they become too thin for further service.

The C. M. & St. P. R'y Co. does not agree in this opinion, but states that according to its understanding a bearing cannot be classified as a solid-lined bearing when the lead lining exceeds $\frac{1}{8}$ inch in thickness.

In order that the matter may be ruled upon by the Arbitration Committee, the matter is referred by both parties to the Arbitration Committee for decision, and two half-bearings of such as are used in the case in dispute are submitted by the Iowa Central R'y as a sample.

DECISION.

The two half-bearings submitted as sample of bearings used in the case in dispute show in one $\frac{3}{8}$ inch thickness of white metal lining, and the other $\frac{1}{2}$ inch thickness of white metal lining at the crown, where the full thickness of the bearing is 1 inch.

It is the opinion of the committee that these should be classed as filled shell bearings under the Rules of Interchange, and not as solid-lined bearings.

NOTE.—*Mr. Barr being interested in this case, was not a party to this decision.*

ARBITRATION CASE No. 500.

NEW YORK, CHICAGO & ST. LOUIS RAILROAD COMPANY

versus

CHESAPEAKE & OHIO RAILWAY COMPANY.

BRAKE BEAM RENEWED. TIME CHARGEABLE.

In March, 1897, the New York, Chicago & St. Louis Railroad Company made bill against the Chesapeake & Ohio Railway Company for renewing one brake beam on C. & O. car 5869, on account of old one being broken, and made a charge of four hours' labor.

The C. & O. R'y Co. objected to the time charged for labor, claiming that a charge of two hours is in accordance with the M. C. B. Rules.

The N. Y. C. & St. L. R. R. Co. argued that two hours' extra labor charged is for removing the good parts from the brake beam, such as the head, brake fulcrum, guide pins, etc., and it thinks the charge is correct, for the reason that it charges the actual cost of the brake beam and its application to the car, and gives credit for full value of the good parts removed, and that the car owner, the C. & O. R'y Co., should pay this labor charge, because the N. Y. C. & St. L. R. R. Co. wishes to use the good parts referred to on other beams, and it does not think it should be out the amount of labor required to make this use of the good parts.

Further correspondence failing to effect settlement, the matter is referred to the Arbitration Committee by mutual consent.

DECISION.

This case hinges on charges for four hours' labor instead of two for replacing a broken brake beam, two hours for removing good material and applying same. Rule 5, Section 19, authorizes a charge of two hours only. As the New York, Chicago & St. Louis Railroad Company charges four hours, contrary to the rules, its bill should be made to conform to the rules, by eliminating the extra two hours' labor charged.

NOTE.—Mr. Mackenzie being interested in this case, was not a party to this decision.

A case in dispute between the Lake Shore & Michigan Southern Railway Company and the Canda Cattle Car Company over charge made by the former against the latter company's cars for journal bearings when wheels were renewed, was considered by the Arbitration Committee, and it was decided that the case was similar to Case No. 478, to which the parties to this dispute are referred.

A case in dispute between the Michigan Central Railroad Company and the Central Railroad of New Jersey, in which the latter company charged the former for brake shoes, heads and bolts, on account of missing brake beam, was considered by the Arbitration Committee, and it was decided that the case was similar to Arbitration Case No. 494, to which the parties to the dispute are referred.

A case in dispute between the Southern Railway Company and the Canda Cattle Car Company, in which the Southern Railway Company rendered bill against the Canda Cattle Car Company for materials connected with the brake beam on account of the brake beam and these materials being missing, was considered by the Arbitration Committee, and it was decided that the case was similar to Arbitration Case No. 494, to which the parties to the dispute are referred.

MINUTES OF MEETING HELD IN CHICAGO, APRIL 27, 1898.

Members present: G. W. Rhodes, Chairman; G. L. Potter.

Messrs. Martin and Mackenzie, who were not present at the meeting, subsequently concurred in these decisions.

ARBITRATION CASE No. 501.

FORT WORTH & DENVER CITY RAILWAY COMPANY

versus

SOUTHERN PACIFIC COMPANY (PACIFIC SYSTEM).

PASSENGER CAR REPAIRS CHARGEABLE TO OWNER.

In July, 1897, the Fort Worth & Denver City Railway Company rendered bill against the Southern Pacific Company (Pacific System) for journal brass applied to Central Pacific coach No. 2071, July 21, 1897. The bill was returned by the S. P. Co. with the claim that repairs to this class of cars are governed by the Appendix to the Master Car Builders' Rules, which are as follows:

"RULE 1.—Each Railway Company shall give to foreign cars, while on its line, the same care and attention that it gives to its own cars."

"RULE 3.—The receiving road is authorized to make such alterations and repairs as are necessary for the safe movement of cars over its line, and must immediately notify the delivering road of all such alterations and repairs, upon receipt of which notification the delivering road shall furnish proper authority to render bill for such alterations and repairs,"

and, according to its understanding of the above, it is clearly contemplated that the accepting road shall make an inspection of the car at the time of acceptance, and make such repairs as are necessary for the safe movement of the car over its line, and the delivering road shall furnish the proper authority to render bill for such repairs; but for any repairs which become necessary after that time, the road on whose line the car may be at the time such repairs become necessary is responsible for same, and not the owner of the car.

The bill was returned by the Ft. W. & D. C. R'y Co. with the claim that it had complied with Rule 1, by applying a brass, the same as though it had been one of its own cars, and, furthermore, that it made the repairs necessary and notified the S. P. Co. as required by Rule 3, by attaching repair stub to the bill, which complies with the M. C. B. Rules for 1896, and that it sees no reason why its bill should not be paid.

The S. P. Co. again returned the bill, with the claim that there is no change in the Appendix to the M. C. B. Rules in 1896 from what they were before as regards notifying the delivering road of the repairs to passenger cars when received, and obtaining authority for making the repairs that are necessary for the safe movement of the car over the line of the receiving road; also, that there is nothing in Rule 3 which can be construed as authority to charge the owning road with such repairs as these in dispute, unless the owner is the delivering road, which is not so in this case. The S. P. Co. also requested that if the Ft. W. & D. C. R'y could not see its way

clear to cancel its bill that the same be submitted to the Arbitration Committee for a decision.

The Ft. W. & D. C. R'y Co. returned the bill, quoting Rule 2, in reference to receiving and delivering cars in good general condition, etc., which would compel it to put in the brass to comply with the last clause of this rule. It also claims that Rule 3 covers the matter of notifying the car owner of any repairs being made, and, in its opinion, by attaching the repair card stub to its bill the owner became responsible; also referring to a circular issued by the S. P. Co. allowing repair card stubs to be attached to bills instead of having the cards sent through the mail, and, furthermore, that Rule 3 does not say that authority *may* be furnished, but that it *shall* be.

The S. P. Co. again returned the bill, and in reply to the statement of the Ft. W. & D. C. R'y Co. that Rule 3 covers the matter of notifying the owner of car of any repairs being made, referred to Rule 3 as quoted, which shows that there is no reference to the owner, but refers to the delivering road, and that there is nothing in Rule 2 or Rule 3 that can, in any way, be construed as making the owner responsible, and that it is of the opinion that the Ft. W. & D. C. R'y Co. is confounding the rules governing passenger car repairs with those governing freight car repairs, as there is no mention made of repair cards and repair card stubs, or to owners' defects in Rules 2 and 3 of the Appendix.

Failing to agree, all correspondence is referred to the Arbitration Committee for decision.

DECISION.

In the opinion of the committee Rule 3 of the Appendix is quite clear as for authority for such repairs as are necessary for the safe running of the car, and it is reasonable to suppose that cars shall not be held from service for authority to make minor repairs. Rule 4 of the Appendix is clear as to the nature of repairs for which authority is to be asked. There is no evidence to show that the car did not have proper care while in the possession of the Fort Worth & Denver City Railway. The bill of the Fort Worth & Denver City Railway is correct and should be paid.

ARBITRATION CASE NO. 502.

BALTIMORE & OHIO SOUTHWESTERN RAILWAY COMPANY

versus

CINCINNATI, NEW ORLEANS & TEXAS PACIFIC RAILWAY COMPANY.

HOSE TORN IN TWO, CHARGEABLE TO CAR OWNER.

On March 31, 1897, the Baltimore & Ohio Southwestern Railway Company rendered bill against the Cincinnati, New Orleans & Texas Pacific Railway Company, for sundry repairs to cars, in which was included a charge of \$1.20 for one air hose applied to C. N. O. & T. P. car 3456, accompanied with its repair card stub calling for one 1¼-inch air hose burst. It is, however, mutually admitted that the cause of renewal was on account of the hose being torn in two instead of burst.

In support of its charge the B. & O. S.-W. claims that the car received no rough usage while in its possession; that air hose can be and are frequently torn in two, by link breaking, drawbar pulling out, or by coming uncoupled (which was probably the

cause in this case) and neither cause could be considered unfair usage unless the car was roughly handled or derailed, which was not the case in this instance, and it therefore considers the charge correct and in accordance with M. C. B. rules.

The C. N. O. & T. P. R'y rejects the charge upon the ground that air hose cannot be torn in two by fair usage; that the car was equipped with automatic couplers, and a hose torn in two would indicate that it was not properly uncoupled at the time the cars were uncoupled.

Failing to agree, the matter is referred to the Arbitration Committee for a decision.

DECISION.

Air-brake couplings are so designed that when cars separate the couplings will part. If the hose tears in two when this occurs, it is evidence of weakness in the hose or improper couplings.

In the opinion of the committee this failure should be charged to the car owner.

ARBITRATION CASE NO. 503.

ELGIN, JOLIET & EASTERN RAILWAY COMPANY

versus

ALTON TERMINAL RAILWAY COMPANY.

AXLES BENT. BILL FOR STRAIGHTENING.

In March, 1897, the Elgin, Joliet & Eastern Railway Company rendered bill against the Alton Terminal Railway Company for repairs to Alton Terminal R'y car 25063, amount \$8.05, as follows:

4 truck springs, 48 pounds.....	\$1.68
1 center pin, 16 pounds	48
4 pounds bolts.....	12
Straightening 4 bent axles	6.00
2 hours' labor.....	40
	<hr/>
	\$8.68

Credit.

48 pounds steel.....	48
20 pounds wrought.....	15
	<hr/>
	63
	<hr/>
Net charge	\$8.05

The bill was accompanied by repair card stub for these items, and stated that the axles were all bent; that the center pin, bolts and two truck springs were broken, and two truck springs gone.

The Alton Terminal R'y Co. returned the bill, objecting to the charge for bent axles, claiming from the nature of the repairs that the car must have been off the track.

The E. J. & E. R'y Co. replied that when the repairs were made to the car it showed no signs of having been off the track or derailed.

Further correspondence between the companies did not result in any additional light being thrown on either side of the controversy, but the Alton Terminal R'y Co. suggested that the car might have been overloaded, and thinks that four bent axles and two truck springs missing is evidence enough to show that the car was either overloaded or derailed.

The E. J. & E. R'y Co. replied that the bill was made in accordance with Rule 3, Section 16, and states that the car was empty when the repairs were made, and there was nothing to indicate that it had been overloaded.

The Alton Terminal R'y Co. replied that the car in question is a 50,000-pound capacity car with diamond trucks, 4 by 7-inch journals, $4\frac{3}{8}$ -inch centers, and that the axles conformed to the M. C. B. 60,000-pound standard.

Further correspondence failing to settle the matter, it is referred by mutual consent to the Arbitration Committee for decision.

The papers were returned to the E. J. & E. R'y Co. for the result of the inspection of the E. J. & E. R'y Co. when it received the car, and a reply was received transmitting the report of the inspector at Aurora where the car was received, which states that this car was received from the C. B. & Q. R. R. on February 20, 1897, with two truck springs gone and one broken; three draft timbers split, and two kinds of steel brake beams. No notice was taken of any bent axles under the car, and had no appearance of having been off the track. He claims that he asked the C. B. & Q. R. R. inspectors, and that they hold the same record as he does, with no mention of bent axles.

DECISION.

It is clear to the committee that the axles could not have been bent under fair usage, and therefore, it is of the opinion that the bill of the Elgin, Joliet & Eastern Railway Company should be corrected, eliminating the charge on account of bent axles.

ARBITRATION CASE No. 504.

UNION PACIFIC SYSTEM

versus

CHICAGO GREAT WESTERN RAILWAY COMPANY.

SECONDHAND PARTS OF COUPLERS. CREDITS ALLOWABLE.

The following synopsis of controversy between the Union Pacific System and the Chicago Great Western Railway relative to payment of bill rendered by the former against the latter company for repairs to cars, amount \$14.58, on account of credit allowed in same for the serviceable parts of a Chicago coupler removed from C. G. W. box car 12268, is signed by a representative of each company to the dispute:

A Missouri Pacific coupler was applied to the car, for which the Union Pacific System made a charge of \$9, plus labor two hours, 40 cents, total \$9.40. It then allowed a credit of 144 pounds steel for the Chicago coupler shank; \$1.69 for the secondhand Chicago knuckle (this being 75 per cent of its value new); 30 cents for the pivot pin and 30 cents for the locking arm; total \$2.29. It claims that inasmuch

as the C. G. W. R'y is responsible for the defective condition of the Chicago coupler that the Union Pacific System should not be subject to any loss by reason of its having to allow credit for the serviceable parts of the Chicago coupler at its value new, as given in Price List No. 5, and then charge it out at 75 per cent of its value new, as provided in Rule 5, Section 12. This section only refers specifically to coupler shanks and knuckles, and the Union Pacific System therefore concludes that the knuckle pins, lock pins, etc., should be credited at their full value and charged out at the same value when used for repairs.

On the other hand, the C. G. W. R'y claims that there was no defect in the Chicago knuckle and that same was simply removed from the car, together with other serviceable parts of the coupler, for the reason that the Union Pacific System did not carry any Chicago couplers in stock with which to make repairs, and argues that the Union Pacific System should stand any loss due to depreciation in value of the serviceable parts.

The Union Pacific System replies that it is its understanding that it is to the interest of the C. G. W. R'y to have its car in continuous service; also to have it properly repaired and kept in good condition by the line which is using it and paying for its use, and this being the case it sees no reason why the handling line should be subject to a loss on account of depreciation in the serviceable parts of the coupler, as explained above; that this would certainly be opposed to business principles which should govern transactions of this kind where the rules do not give any specific guidance for settlement.

Both companies signify their willingness to have the matter submitted to the Arbitration Committee for decision.

DECISION.

Rule 5, Section 12, provides a charge of 75 per cent for secondhand material in the case of couplers, knuckles and iron brake beams, but it does not provide a similar credit. The committee is therefore of the opinion that the parts of couplers not damaged should be credited at the value when new, as heretofore.

NOTE.—The Arbitration Committee believes that this is strictly in accordance with the rules, but that it should be changed at the convention in June, and it will so recommend, so as to provide that 75 per cent can be credited in such cases, as well as charged.

ARBITRATION CASE NO. 505.

LEXINGTON & EASTERN RAILWAY COMPANY

versus

LOUISVILLE & NASHVILLE RAILROAD COMPANY.

COMBINATION TO SHOW UNFAIR USAGE MUST BE AT SAME END OF CAR.

The Louisville & Nashville Railroad Company rendered bill No. 5206 against the Lexington & Eastern Railway Company for repairs made March 10, 1897, to L. & E. R. R. car 617, including therein a charge for one draft timber, three draft timber bolts, one draw lug, eight draw lug bolts, four deadwood bolts, and one draft

spring. The draft timber, draw lug and draft spring were broken, and all bolts except the four deadwood bolts were damaged, they being too long.

The L. & E. R'y Co. objected to the bill, claiming that the draft timber and draft spring form a combination, designating unfair usage as shown in Rule 3, Section 48, 1896 Code.

The L. & N. R. R. Co. replied, explaining that the draft timber broken and draft spring broken were at opposite ends of the car, and that they understand that the combination of defects must be at the same end of the car to be considered unfair usage under the rules.

The L. & E. R'y Co. still declined to pay the bill, and the only point upon which a ruling is desired, is whether or not a combination of defects, part of which is at one end of the car, and part at the other, come under the ruling of unfair usage.

DECISION.

The paragraphs in the note after Section 48 of Rule 3, except the last, have been generally so construed as to require that the damaged parts comprising a combination shall be at one end of the car, and this would seem to be a proper construction to place upon these sections of the rules, for the reason that if a car had been damaged while being handled in a manner to be considered unfair usage, the parts broken, to make the combination, would be expected to have broken on one end of the car. If they were distributed between both ends of the car, it would indicate that they had been formerly damaged, or that the material was of inferior quality.

In the opinion of the committee the parts damaged, to comprise a combination, must be located at one end of a car. The bill of the Louisville & Nashville Railroad Company is therefore correct and should be paid.

ARBITRATION CASE No. 506.

CHICAGO & ALTON RAILROAD COMPANY

VERSUS

WISCONSIN CENTRAL LINES.

CAR BODY DESTROYED, ONE TRUCK RETURNED AND ONE PAID FOR.

On October 12, 1897, the body of Chicago & Alton Railroad car No. 80 was destroyed on the Wisconsin Central Lines. The Wisconsin Central Lines agreed to pay for the value of the body of the car and one truck, and return the other truck to the C. & A. R. R. The C. & A. R. R. claims that both trucks should be returned, or that both trucks should be paid for in accordance with the M. C. B. Rules, while the Wisconsin Central Lines claim that they are justified in returning one truck.

Being unable to agree on this point, it was decided to submit the same to the Arbitration Committee for decision.

DECISION.

While there is no specific rule governing the returning of one truck only, it seems to be equitable, as between railroad companies, that such should be the prac-

tice. The question whether the truck is of modern design or out of date, and to be dismantled, does not seem to be relevant; the truck, whatever it may be, is the property of the company owning the car, and in returning it, it is simply returned to the rightful owner.

The course of settlement proposed by the Wisconsin Central Lines is correct, and the Chicago & Alton Railroad Company should settle on the basis named.

ARBITRATION CASE NO. 507.
PENNSYLVANIA RAILROAD COMPANY

versus

NEW YORK, CHICAGO & ST. LOUIS RAILROAD COMPANY.
CENTER SILLS DECAYED, CHARGEABLE TO OWNER.

In September, 1897, the Pennsylvania Railroad Company made repairs to car No. 3131 of the New York, Chicago & St. Louis Railroad Company for two decayed center sills. The bill was returned by the N. Y. C. & St. L. R. R. Co., quoting Arbitration Case No. 475, with the request that the bill be corrected accordingly.

The Penna. R. R. Co. replied that Arbitration Case No. 475 covers repairs which form a combination not chargeable under Section 42 of Rule 3, and as the repairs to car 3131 consisted of the replacement of two center sills, which do not form a combination, case No. 475 does not apply.

The N. Y. C. & St. L. R. R. Co. further objected to the bill, claiming that while Arbitration Case No. 475 forms a combination not chargeable, yet if the sills were decayed they should have been reported to the owner, as per Section 1 of Rule 7.

The Penna. R. R. Co. claims that this case is not parallel to that of Arbitration Case No. 475; that it is simply a case of worn-out sills, and that in accordance with the first paragraph of the preface to Rules it was proper for them to make repairs, and in accordance with the rules the car owner is responsible; that the repairs were made under authority of Section 24 of Rule 3; that there was no evidence of unfair usage, and that the rules allow a charge for two longitudinal sills by defining rough usage in Section 42 of Rule 3, as necessitating the replacement or splicing of more than two sills.

The N. Y. C. & St. L. R. R. Co. further objected, quoting Rule 7 as to the requirements of worn-out or damaged cars: "A car unsafe to load on account of general worn-out condition, due to age or decay, shall be reported to its owner, who must be advised of all existing defects. If the owner elects to have it sent home," etc. The latter part of Decision 475 reads: "It is the opinion of the committee that in such a case as this it would be best to consider Rule 7 as applying, and that the repairs to decayed parts, not damaged but allied with damaged parts, should not be charged to the owner without first getting authority to make such repairs at the owner's expense."

Both parties sign abstract and request decision of the Arbitration Committee.

DECISION.

By referring to the stub attached to the bill for repairs to car 3131, it will be found to read, "center sills decayed and broken." As there was no other damage

to car shown on the stub or card it was proper to bill the owners for the expense of renewing the sills broken on account of decay. Rule 3, Section 42, authorizes this charge, as only two sills were broken. Case No. 475 does not apply, as in that case the parts involved embodied a combination defining rough usage. In the opinion of the committee the bill as rendered is correct and should be paid.

NOTE.—Mr. Mackenzie being interested in this case, was not a party to the decision.

ARBITRATION CASE No. 508.

BURTON STOCK CAR COMPANY

versus

NEW YORK, TEXAS & MEXICAN RAILWAY COMPANY.

CARS DESTROYED BY WINDSTORM, RESPONSIBILITY FOR.

Under date of May 6, 1897, the New York, Texas & Mexican Railway Company advised the Burton Stock Car Company that Burton stock car 6194 was wrecked on its line at Keeran's, on March 28, 1897, during a windstorm, and asked for shipping directions for return of trucks; also, that New England Car Co. car 5333, operated by the B. S. C. Co., was damaged at the same time and place; that repairs would be made to the latter car, and bill rendered against the B. S. C. Co. Under date of May 13, 1897, the N. Y. T. & M. R'y Co. advised the B. S. C. Co. that the above mentioned cars were blown out of siding by windstorm, and the body of car 6194 completely demolished and wreck burned.

On May 17, 1897, the B. S. C. Co. requested shipment of trucks to Chicago, and stated that bill for value of body would be rendered from its Boston office.

Further correspondence with the N. Y. T. & M. R'y Co. discloses the fact that it disclaims any responsibility whatever, and would not ship the trucks unless the B. S. C. Co. would guarantee the freight charges and authority to repair car 5333. The B. S. C. Co. then requested the N. Y. T. & M. R'y Co. to repair N. E. car 5333, and render bill against the car owner, payment of same to be withheld until the matter could be submitted to the Arbitration Committee for decision, and invited the N. Y. T. & M. R'y to join in bringing the matter before that committee for decision.

The N. Y. T. & M. R'y Co. replied that the cars were damaged by a storm that did considerable damage to the property of that company at different points on its line, and that it was not possible for that company to have foreseen the cause or to have taken any further precautions to prevent the damage to the cars in question; that it gave as good protection to these cars as it did to its own and to its other property at various points along the line where damage was done. On this account it disclaims responsibility for damage to these cars.

The Burton S. C. Co. argues in reply that its claims are covered by M. C. B. rule 3, sections 19 and 43, and refers to Arbitration Case 122 as a parallel case. It says that it would be a gross injustice to car owners and railroad companies were they held responsible for damage to their cars arising from negligence or accident under conditions not covered by existing rules of interchange while in the service of other companies, and that as these cars were blown out of siding and subsequently

one of them was burned up, it believes the railroad company handling the cars is responsible for the damage.

Further correspondence failing to settle the matter, it is referred by the parties to the dispute to the Arbitration Committee for decision.

DECISION.

There is no evidence that the cause of the destruction of the cars in question was due to an act of Providence wholly. The fact that the cars ran out of the siding and were wrecked would indicate carelessness on the part of the railroad having the cars in its possession in not having the brakes set, and the fact that the cars were not destroyed where they stood, but ran some distance before being destroyed, would also indicate that the windstorm was not of such a nature as to have destroyed the cars had they been properly cared for by the railroad in whose possession they were.

In the opinion of the committee the New York, Texas & Mexican Railway Company should either rebuild the cars and return them to the owners, or reimburse the owners for the value of same.

ARBITRATION CASE No. 509.

NEW YORK, CHICAGO & ST. LOUIS RAILWAY COMPANY

versus

CHICAGO & NORTH-WESTERN RAILWAY COMPANY.

DRAFT TIMBERS AND DEADWOOD DAMAGED ON CAR WHICH HAD DRAFT RIGGING REPAIRED AWAY FROM HOME.

On August 14, 1897, New York, Chicago & St. Louis Railway Company car 15726 was repaired at the shops of the Chicago & North-Western Railway at Carroll, Iowa, and M. C. B. Association repair card applied, as follows:

Four $\frac{3}{8}$ by 17-inch bolts; one drawbar key; four $\frac{1}{2}$ by 3-inch lag screws; one pin-lifter casting; one drawbar stem; one 7-inch coil spring; one carrying iron, 13 $\frac{1}{2}$ pounds; labor, two hours. Credit, 10 pounds bolts; 18 pounds coil spring; 13 pounds drawbar stem; 10 pounds carrying iron.

The C. & N.-W. R'y Co. made bill on this repair card, in amount \$2.37.

On August 31, 1897, car 15726 was offered to the owner by the E. J. & E. R'y at Hobart, Ind., bearing the repair card of the C. & N.-W. R'y dated August 14, and under the joint inspection the following defects were found to exist upon the car when delivered, the joint inspection card being attached to the papers: "N. Y. C. & St. L. car 15726, received from the E. J. & E. R. R. at Hobart, August 31, with the following repairs made, not standard to the car: One 7-inch spring in place of 8-inch draft spring; four carry-iron bolts, $\frac{3}{8}$ by 17-inch in place of $\frac{7}{8}$ by 18 inches; one wrong carrier iron; one bent lifter and two bent lifter castings, wrong pattern; two draft timbers and one deadwood damaged, new; all at same end of car." Signed by C. Carey, E. J. & E. R'y, and J. B. Johnson for N. Y. C. & St. L. R. R.

The N. Y. C. & St. L. R. R., under date of October 6, wrote the C. & N.-W. R'y taking exceptions to the bill, amount \$2.37, and forwarding the joint evidence

card, requesting that the amount \$2.37 be canceled, and stating that the N. Y. C. & St. L. R. R. would make bill on joint evidence for the repairs enumerated, amount \$5.18.

To the request of the N. Y. C. & St. L. R. R. under date of November 2, the C. & N.-W. R'y replied that "in the next bill rendered against your company we will give you credit for \$2.37 for the repairs enumerated, as charged to your car 15726, on account of the items of carrier iron and drawbar spring forming a combination." In regard to the wrong repairs to the two draft timbers and deadwoods, exceptions are taken by the C. & N.-W. road that it was not simultaneous damage, and that it was not covered by repair card. To this the N. Y. C. & St. L. R. R. replied, under date of November 4, "We have made bill against you, in amount \$5.18, the authority being attached," i. e., joint evidence card between the delivering road and the owner of the car, replying at the same time that there is no question as to there being a combination, as shown by the joint evidence card.

The papers are again returned by the C. & N.-W. R'y, still claiming that the damage was not caused at the time the other repairs were made, and calling attention that the items are not covered by the M. C. B. Association repair card.

The papers were again returned by the N. Y. C. & St. L. R. R. under date of November 11, calling attention to the fact that the opinion of the N. Y. C. & St. L. R. R. was substantiated by the joint evidence, which should be final as to the facts, under the rules.

Again, under date of November 12, the papers are returned by the C. & N.-W. R'y, declining the bill on the grounds that the draft timbers and deadwood were not mentioned on the repair card. Under date of November 17 the papers are again returned, calling attention to the report of the foreman at Carroll that broken draft timbers and deadwood did not come under joint evidence of wrong repairs, and that in making repairs he complied with Section 5 of Rule 4, and no charge should be made against them for the car.

The papers are again returned by the N. Y. C. & St. L. R. R. under date of November 23, in which the N. Y. C. & St. L. R. R. acknowledges receipt of letter of C. & N.-W. R'y of November 17, and requests that charge to car 15726 be cut out, stating, "As this matter has been fully explained in our letter and you seem unwilling to accept the joint evidence as authority, we propose the matter be referred to the Arbitration Committee for decision."

The papers are again returned, under date of November 24, by the C. & N.-W. R'y, calling attention to its letters of November 8 and 12, regarding repairs made to car 15726, at Carroll, Iowa, in which it says, "We will pass the joint evidence bill with the exception of the two drawbar timbers and deadwood, nor were they damaged simultaneously with the other items. We are, however, willing to reimburse you for all the items as charged in our bill against your company, as per repair card stub signed by our foreman at Carroll."

The parties to the dispute sign the above joint statement for submission to the Arbitration Committee for decision.

DECISION.

The dispute in this case is practically settled except in the matter of a damage to two draft timbers and one deadwood which is described on the joint evidence

card as "new." Section 5 of Rule 5, 1896, reads: "When repairs to foreign cars have not been made in accordance with the Code of Rules, the owner may make bill against the company making the wrong repairs for the cost of changing the car to the original standard, or to the requirements of Rule 4. The joint evidence of the owner of the car and the delivering road that repairs are not proper shall be final."

There is no evidence submitted showing that the North-Western damaged the draft timbers and deadwood; it is as likely to have occurred on an intermediate road as on the C. & N.-W.

In the opinion of the committee the New York, Chicago & St. Louis Railway Company should cancel its charge for two draft timbers and one deadwood.

NOTE.—*Mr. Mackenzie being interested in this dispute, was not a party to the decision.*

ARBITRATION CASE No. 510.

LAKE SHORE & MICHIGAN SOUTHERN RAILWAY COMPANY

versus

ATCHISON, TOPEKA & SANTA FE RAILWAY COMPANY.

LINK-AND-FIN DRAWBAR IN CAR ORIGINALLY EQUIPPED WITH M. C. B. COUPLER.

A dispute having arisen between the Lake Shore & Michigan Southern Railway Company and the Atchison, Topeka & Santa Fe Railway Company as to which of the several sections of the M. C. B. Rules should govern in the case of a link-and-pin coupler applied to a car intended to be equipped with an M. C. B. coupler, and so stenciled, it is referred to Arbitration Committee for decision by the L. S. & M. S. R'y Co., with correspondence and repair card of the Missouri Pacific R'y Co. attached.

The following argument is made by the A. T. & S. F. R'y Co. in its correspondence with the L. S. & M. S. R'y Co.:

"Section 14 of Rule 4 states that delivering companies shall not be responsible for any wrong repairs not made by them. Section 3 of Rule 5 states that owners may counterbill against the company making wrong repairs, if owner's defects. In this case it is admitted that the wrong repairs were made by the Missouri Pacific R'y; therefore, under Section 14 of Rule 4, the A. T. & S. F. R'y is not responsible for the wrong repairs, as they were not made by it; and furthermore, Section 3 of Rule 5 makes it very clear that the L. S. & M. S. R'y Co. may make counter bill against the Missouri Pacific R'y for the cost of changing the car to the original standard, providing the work has been done.

"In view of the above, and the fact that a joint evidence statement will be given covering the wrong repairs, and that the car bore repair card of the Missouri Pacific R'y Co. showing that they made the wrong repairs, there would seem to be no necessity for the delivering company, or A. T. & S. F. R'y Co., to issue a defect card to conform to Section 31 of Rule 3. If the L. S. & M. S. R'y Co. had not been the owner of the car, then a defect card would be necessary; therefore, there

would be no justice in placing the responsibility on the A. T. & S. F. R'y when the Missouri Pacific R'y Co. acknowledges the responsibility."

The following arguments are made by the L. S. & M. S. R'y Co. in support of its position:

"This company takes the ground that the delivering company is responsible where cars intended to be equipped with M. C. B. couplers, and so stenciled, are found with link-and-pin drawbars, for the following reasons.

"First, That the 'carding' mentioned in the paragraph found in the center of page 12 of the book of rules, directly under the word 'bodies,' does not refer to repair card which may have been applied several days or months prior to the time the owners have an opportunity of making proper repairs.

"Second, That the sole object of embodying Section 31 of Rule 3 in the list of items for which the delivering company is responsible was to *compel* railroad companies to maintain the M. C. B. coupler on cars so stenciled and to prevent the use of link-and-pin drawbars in such cars.

"Third, It further claims that if it is to accept Section 27 of Rule 3 as meaning what it says, it must also accept literally Section 31 of the same rule, which is included in the same bracket, opposite 'delivering company responsible.'

"Fourth, Sections 28 to 33 of Rule 3 were included in the rules with a view of preventing the running of cars not properly equipped, it being decided that all features mentioned in those sections are absolutely necessary to be maintained in order to retain the standard of efficiency and safety that it is considered important to maintain."

DECISION.

Section 31 of Rule 3 is an exception to Section 14 of Rule 4, and it reads as follows: "Cars intended to be equipped with M. C. B. couplers, and so stenciled, if found with link-and-pin drawbars." Delivering company responsible.

In the opinion of the committee the A. T. & S. F. R. R. Co. is responsible to the Lake Shore for the improper drawbar in the car when delivered.

ARBITRATION CASE NO. 511.

LAKE SHORE & MICHIGAN SOUTHERN RAILWAY COMPANY

versus

PENNSYLVANIA RAILROAD COMPANY.

SECONDHAND COUPLERS, CHARGES AND CREDITS ALLOWABLE WHEN REPLACEMENT PRICE IS QUOTED.

In November, 1897, the Lake Shore & Michigan Southern Railway Company applied one secondhand Janney knuckle to Pennsylvania Railroad Company car 64288; one secondhand Janney coupler, each, to cars 61533 and 64322; one new Gould coupler, each, to cars 60511 and 61794, and rendered bill against the Pennsylvania Railroad Company for these particular items, as follows:

Car No. 64288, 1 secondhand Janney knuckle.....	\$.19
Car No. 61533, 1 secondhand Janney coupler casting.....	2.44
Car No. 64322, 1 secondhand Janney coupler casting.....	2.44
Cars Nos. 60511 and 61794, charge to each car, as follows:	
1 new Gould coupler, complete	12.50
Less scrap in Janney coupler casting.....	\$2.25
Less good parts released.....	2.89
	<hr/> 5.14
Net charge to each car	<hr/> \$7.36

The P. R. R. Co. objected to the above charges for the following reasons:

Car No. 64288.—Section 12 of Rule 5 provides that when M. C. B. couplers or knuckles are replaced, good secondhand material may be used, but the charge shall be limited to 75 per cent of the price when new.

Section 11 of Rule 5 provides that M. C. B. couplers or parts of same shall be charged at manufacturers' current market prices, *or replacement prices*.

Price List No. 5, as issued by the Secretary of the Master Car Builders' Association, under date of September 1, 1897, quotes replacement price of a Janney coupler at \$1, and in conformity with the Rules and Price List mentioned above, the following charge should be made to the car in question: 1 secondhand Janney knuckle (three-fourths of replacement price, \$1) 75 cents, instead of 19 cents, as charged.

Cars Nos. 61533 and 64322.—These are parallel cases with Car No. 64288, with the exception that they cover the application of secondhand Janney coupler castings instead of a knuckle, and the charge should be made as follows:

1 secondhand Janney coupler casting (three-fourths of replacement price, \$4) \$3 to each car, instead of \$2.44 as charged.

Cars Nos. 60511 and 61794.—Charge to these cars is covered entirely by Arbitration Case No. 393, wherein good parts released are credited at new prices, making charge as follows:

1 new Gould coupler, complete	\$12.50
Less scrap in Janney coupler casting removed.....	\$2.25
Less good parts released as follows:	
1 Janney knuckle	3.25
1 Janney locking pin.....	.30
1 Janney knuckle pin.....	.15
	<hr/> 5.95
Net charge	<hr/> \$6.55

to each car, instead of \$7.36 as charged.

The P. R. R. Co. understands Sections 11 and 12 of Rule 5, which are quoted above, to the effect that couplers or parts of same removed and applied, when of a make for which replacement prices are quoted, the charge for the secondhand material applied should be at 75 cents of the replacement price, that, in its opinion, being

the new price as indicated in Section 12. The 75 per cent value on secondhand knuckles does not apply to credits, but simply to charges.

The L. S. & M. S. R'y Co. maintains that the words "when new" found in Section 12 of Rule 5, do not in any way refer to replacement prices for M. C. B. coupler castings and knuckles, for this reason: \$4 (the replacement price for Janney coupler castings) does not represent the price when new of such a casting; neither is \$1 (the replacement price for Janney knuckles) the price when new of a Janney knuckle. The price of a new Janney coupler casting is \$6.25, whether this amount be paid in cash, or \$4 cash and a scrap casting, which has been decided by the Arbitration Committee as being worth \$2.25. The price of a new Janney knuckle is \$3.25, whether this amount be paid in cash, or \$1 in cash and a scrap Janney knuckle, which has been decided by the Arbitration Committee as being worth \$2.25.

Decision in Case No. 393 was rendered under Rules of 1896, which did not include Section 12, Rule 5, of 1897 Rules.

DECISION.

Section 12 of Rule 5 is not clearly worded, and a revision of this rule will be recommended. Section 11, Rule 5, is similar to Section 14 of the 1896 Rules, under which there was never any dispute. The fifth line of Section 11 reads: "When the coupler manufacturers do not quote a replacement price," etc., scrap credits will be allowed. When they do quote a replacement price, a different ruling must prevail. A replacement price is quoted for Janney material, and therefore must be allowed.

In the opinion of the committee the bill of the Lake Shore & Michigan Southern Railway should be corrected in accordance with the claim of the Pennsylvania Railroad Company.

ARBITRATION CASE NO. 512.

CHICAGO, MILWAUKEE & ST. PAUL RAILWAY COMPANY

versus

DES MOINES UNION RAILWAY COMPANY.

TIME CHARGEABLE FOR RENEWING END SILL ON TANK CAR.

The Des Moines Union Railway Company rendered bill against the Chicago, Milwaukee & St. Paul Railway Company for repairs to U. T. L. car 2706 on defect card issued by the C. M. & St. P. R'y Co. inspector at Madrid, October 16, 1897, covering one end sill and other items, broken, and charged 11 hours' labor for replacing the end sill, which is located outside of siding, claiming that this is the actual time consumed, and that the provision made in Section 17 of Rule 5 (which allows 7 hours' labor for replacing an end sill outside of siding) does not apply to a tank car, because Section 21 of Rule 5 governs for value of body and trucks of refrigerator cars, special stock cars and cars designed for special purposes, destroyed; therefore the limitations placed upon the hours which may be charged for labor in doing the various items enumerated in Section 17 of Rule 5 do not apply to tank cars, they being cars designed for special purpose, and actual labor must be charged.

To this the C. M. & St. P. R'y Co. objects, claiming that the hours of labor shown in the first column of Section 17 of Rule 5, under heading "ordinary cars," applies to any and all freight cars aside from refrigerator cars, and that under term "freight" are included all box cars, flat cars, gondola cars, stock cars for the bodies and trucks of which a specific value is shown in Section 19 of Rule 5, as well as all special stock cars or any cars designed for special purposes (refrigerator cars always excepted), referred to in Section 21 of Rule 5, and insists that the proper charge for labor in replacing a sill outside of siding on a tank car is seven hours, as specified in Section 17 of Rule 5.

Failing to come to an understanding on this point, the matter is submitted to the Arbitration Committee on request of the Des Moines Union R'y and the consent of the C. M. & St. P. R'y Co.

DECISION.

Section 17 of Rule 5 provides a rate for all cars other than refrigerator cars for replacing an end sill outside the siding.

In the opinion of the committee the bill of the Des Moines Union Railway Company should be corrected accordingly.

NOTE.—*Mr. Barr being interested in this case, was not a party to the decision.*

ARBITRATION CASE NO. 513.

UNION PACIFIC RAILROAD COMPANY

versus

OREGON SHORT LINE RAILROAD COMPANY.

END GATE MISSING, RESPONSIBILITY FOR.

The following is a synopsis of controversy between the Union Pacific System and the Oregon Short Line Railroad Company relative to payment of charges contained in U. P. bill Audit No. 45004, against the O. S. L. R. R. Co. for replacing an end gate found missing from O. S. L. coal car 13873.

In support of the correctness of the charge, the U. P. System advances the following facts and argument:

O. S. L. coal car 13873 arrived at Denver, April 19, 1897, with end gate missing. By looking up previous record of car it finds that the car was received from the C. R. I. & P. R'y at Topeka, Kansas, January 13, 1897, with both end gates, and remained in service on Kansas Division up to April 19, 1897, when it went to Denver. Inspection record at Topeka, Kan., shows the car arriving at that point March 15, 1897, loaded with cinders and both ends in car. The car was unloaded March 27, and so far as it can be learned, end gates were all right then; car was picked up by conductor on March 29, empty, and end gate was missing. Investigation was made by the superintendent as to the usage the car had received, but no information was gathered which would indicate any unfair usage; that the trainmen did not remove the gate, they having positive orders not to remove them.

The end gates were fastened in the following manner: the end gate rod passes through two eye bolts, which pass through the floor of car and are fastened on the under side with one nut each. It finds that these eye bolts often break, in which event the end gate could be easily lost; also that the nuts work off the eye bolts which allows it to be pulled out of the sill, with the result that the end gate is loosed and can be lost from the car. It does not attempt to explain how the end gate was lost from this car, but the presumption is that it was lost out while car was in transit at Topeka; and as there is no evidence of unfair usage, and it was impossible to find, after careful investigation, that the car had been unfairly used, it considers the owner of the car liable under Section 40 of Rule 3 of the 1896 Code of Rules, which provides that owners are responsible for "locks, grain doors, and all inside or concealed parts of car, missing or damaged under fair usage, or failure or loss under fair usage of any part of the body of the car, except as provided in Rule 5, Section 6. End gates are not stated to be exceptions, therefore the rule should apply to them, providing car had fair usage. It states that if this car was damaged while being switched in Topeka yard, it received no unfair usage, and according to Arbitration Case No. 457, unless the car was unfairly used the owner cannot avoid responsibility. It further states that the car received all possible and necessary inspection while in the possession of the Union Pacific R. R.

The following is the argument advanced by the O. S. L. R. R. Co.:

The preface to the M. C. B. Rules defines owner's responsibility and fair usage as "ordinary wear and tear in fair service," and the handling line's responsibility as "damage done by unfair usage, derailment," etc. Rule 1 of the M. C. B. Code requires the handling line to give foreign cars the same inspection and care as they do their own cars. The neglect to give this car proper inspection, or to make necessary repairs, in time to prevent further loss or damage, constitutes negligence and unfair usage on its part. The manner in which this end gate was fastened, even admitting the possibility of eye bolts breaking and allowing the end gate to drop in on the car floor, the length of the gates being the same as the width between the coal sides, would prevent it from passing beyond the cleats and over the ends of the car and become lost without one end of the gate being lifted over the height of the coal sides and the gate turned quarter way around. It claims this requires physical and deliberative force, and constitutes unfair usage. It argues further, that first, on account of the manner of fastening, second on account of the length and weight of the end gate itself, and third, if the eye bolts had failed, it was the duty of the Union Pacific R. R., by proper inspection, to have known their condition and prevented further loss on the car by making immediate and proper repairs. It claims that the end gates of a coal car are just as much permanent fixtures as the sides.

This case is submitted to the Arbitration Committee for its decision as to whether this loss is fair or unfair usage.

DECISION.

In the opinion of the committee Section 40 of Rule 3, 1896 Code, covers this case, and the bill of the Union Pacific System is correct, and should be paid.

ARBITRATION CASE NO. 514.

CHICAGO, ROCK ISLAND & PACIFIC RAILWAY COMPANY

versus

PEORIA & PEKIN UNION RAILWAY COMPANY.

ANGLE COCK, PRICE CHARGEABLE.

On February 8, 1896, the Peoria & Pekin Union Railway issued M. C. B. defect card for C. R. I. & P. car 60090, and this card included $1\frac{1}{4}$ -inch angle cock. The Chicago, Rock Island & Pacific Railway made repairs, using the card of the P. & P. U. R'y to support its bill against the P. & P. U. R'y, and charged \$2 for one $1\frac{1}{4}$ -inch angle cock, as per Westinghouse Air-Brake Catalogue, Fig. 8, which shows $1\frac{1}{4}$ -inch angle cocks complete, \$2. This is in full-face type and red ink in catalogue. The catalogue shows "Items printed in full-face type and red ink must be purchased from the Westinghouse Air Brake Co." The C. R. I. & P. R'y claims the prevailing price for $1\frac{1}{4}$ -inch angle cock is \$2, as it passes bills of other companies charging this price and charges other companies in their bills the same price.

The P. & P. U. R'y objects to charge of \$2, and maintains that these angle cocks are not patented, that they are made by several manufacturers, and that the price in January, 1896, was published by Crane Co., Chicago, at \$1.75 each, and so listed in their catalogue issued in January, 1894, thus showing that this price had been published over two years. The P. & P. U. R'y further refers to Arbitration Cases 157 and 158, and quotes from the decision in Case 157: "If the latter road has evidence that the combination named is sold in open market, it is the opinion of the committee that the C. B. & Q. R. R. Co. cannot charge any more than the prevailing price charged by manufacturers." Referring to these decisions, the P. & P. U. R'y Co. claims that angle cocks are sold in open market, and that the price of \$1.75, published by a reputable and responsible manufacturing concern for over two years previous to the date of the M. C. B. defect card given in this case, establishes the market price. The P. & P. U. R'y further claims that if the C. R. I. & P. R'y is bound by the clause in the Westinghouse Catalogue, as follows: "Items printed in full-face type and red ink must be purchased from the Westinghouse Air Brake Co.," that the C. R. I. & P. R'y has a contract with the Westinghouse Co. whereby a discount of 15 per cent is allowed, making a net price of \$1.70 for angle cocks bought by C. R. I. & P. R'y from the Westinghouse Air Brake Co. This 15 per cent discount was open to all railway companies purchasing from Westinghouse Co. for over one year previous to the date of M. C. B. defect card given in this case. The P. & P. U. R'y claims that the "current market price" is not the price published where material "must be purchased from the Westinghouse Air Brake Co."—*subject to discount*. The P. & P. U. R'y claims that strange complications will result if a high price paid by any company is to be considered as the "current market price." The P. & P. U. R'y does not pass bills of other companies charging \$2 each for angle cocks, neither does the P. & P. U. R'y charge other companies \$2 each for angle cocks, and the P. & P. U. R'y for the past two years has bought $1\frac{1}{4}$ -inch angle cocks in the open market for \$1.65 each and charges other railway companies this

price. The P. & P. U. R'y has charged them to the C. R. I. & P. R'y system at the price of \$1.65.

Both parties agree to refer the matter to the Arbitration Committee for decision.

DECISION.

It is the opinion of the committee that the net cost of angle cocks should be considered as the market price. It is well known that this is \$1.70, and the bill should be corrected accordingly.

ARBITRATION CASE NO. 515.

CHICAGO, ROCK ISLAND & PACIFIC RAILWAY COMPANY

versus

KANSAS CITY, PITTSBURG & GULF RAILROAD COMPANY.

REPAIR CARD NOT ATTACHED TO CAR, BUT CARD AND STUB ACCOMPANYING BILL.

In May, 1897, the Chicago, Rock Island & Pacific Railway Company rendered bill against the Kansas City, Pittsburg & Gulf Railroad Company for \$5.07, including one 1¼-inch air hose applied to K. C. P. & G. car 8110 on May 7, and three brasses applied to K. C. P. & G. car 3544 on May 23. The air hose and brasses were applied by train crews and reported to car repairers at terminals. It made M. C. B. repair cards but failed to get the bodies of the cards on the cars. On account of this failure, the bodies of cards accompanied C. R. I. & P. bill to the K. C. P. & G. R. R. Co.

The K. C. P. & G. R. R. Co. declined to pay the bill, claiming that cards should have been applied to the cars as required by M. C. B. Rule 4, Section 15.

The C. R. I. & P. R'y Co. claimed that it is not always practicable, for various reasons, to apply cards at the time repairs are made, and that it is customary when cards cannot be applied to forward them or attach them to the bills. The question is, can bills be declined when Rule 4, Section 15, is not literally complied with?

The above statement is signed by representatives of both roads parties to the dispute, and is referred to the Arbitration Committee for decision.

DECISION.

Section 2, Rule 5, reads: "Car owners may require receipt of repair card or stub before payment of bill for repairs."

As the requirements of the rules in this matter have been complied with, it is the opinion of the committee that this bill should be paid.

ARBITRATION CASE NO. 516.

UNION PACIFIC RAILROAD COMPANY

versus

OREGON RAILROAD & NAVIGATION COMPANY.

PASSENGER CAR REPAIRS CHARGEABLE TO OWNER.

In September and October, 1897, the Oregon Railroad & Navigation Company rendered certain bills against the Union Pacific System for work done on passenger

cars of the U. P. System, on its line, the work being done at different points but not when the cars were received at points of interchange, and being necessitated by ordinary wear and tear of cars in service. The items charged were such as air brake, signal and steam hose, piston packing leathers, brake shoes, bolts, nuts, release springs and similar items.

It is agreed between the two parties that they were working under the Appendix to the M. C. B. Code of Rules, with the exception that the portion requiring authority to be obtained before bills are rendered had been previously waived by mutual understanding.

The O. R. & N. Co. refers to Arbitration Case 287, and says it is led to believe that the Arbitration Committee considers owners responsible for repairs to passenger cars made necessary from wear or failure under fair usage while in service on the line of another company, whether it be a direct connection or through an intermediate company, as in this case.

The U. P. System finds no objection to the charges in the two bills in question, and considers that as owners of the cars it ought to pay the bills, but it claims that the Appendix to the M. C. B. Rules does not give the O. R. & N. Co. authority to charge the U. P. System; that Rule 3 of the Appendix only provides for billing for repairs and such defects as are shown at points where passenger cars are interchanged. It states that it made a practice some time ago to charge some of its connections, other than the O. R. & N. Co., for repairs to worn-out parts of passenger cars, but its bills were rejected on the ground that they were not authorized by the Appendix, and that it thus found that it could not collect for such repairs, and it therefore could do nothing but reject bills of other roads made on a similar basis.

The parties to the dispute desire to have the Arbitration Committee decide the responsibility for the charges such as contained in these bills, and that it, at the same time, give an exhaustive opinion as to the intent of the Appendix in matters of repairs to owners' defects on passenger cars.

DECISION.

The point in dispute is similar to that in Arbitration Case No. 287, and in the opinion of the committee the bill of the Oregon Railroad & Navigation Company is correct, and should be paid.

ARBITRATION CASE NO. 517.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS RAILWAY COMPANY

versus

VICKSBURG, SHREVEPORT & PACIFIC RAILROAD COMPANY.

AXLE BENT, OWNER CHARGED FOR STRAIGHTENING.

On May 25, 1897, the Cleveland, Cincinnati, Chicago & St. Louis Railway Company had occasion to remove one pair of wheels from Vicksburg, Shreveport & Pacific Railroad Company car No. 26175, at Linndale, Ohio, on account of one bent axle, and when rendering bill for same the charge of \$2.30 was made, as follows:

Cost of changing one pair of wheels	\$1.50
Cost of straightening axle.....	.80

Total	\$2.30
-------------	--------

When the bill reached the V. S. & P. R. R. Co., the latter stated that there was nothing in the rules authorizing this charge, and amount of bill for changing wheels should be \$1.50.

The C. C. C. & St. L. R'y Co. does not claim that it is necessary to have every specific item mentioned in the rules in order to permit or authorize a charge. A bent axle is an owner's defect, providing car has not been roughly handled or misused or off the track, which was not the case in this instance; therefore, the charge made by the C. C. C. & St. L. R'y Co. is considered by the latter company as a proper one, the same as work performed on any other part of the car and which is considered as owner's defect (see Rule No. 5, Section 8, authorizing an additional charge of \$1.50 for all labor for each pair of wheels and axles removed from the trucks). This \$1.50, the C. C. C. & St. L. R'y Co. considers, does not contemplate, nor was not intended to cover, any cost of any work on the axle itself, it being the fixed price for changing each pair of wheels and axles regardless of what the cause of change was. There is nothing in the rules prohibiting a charge against the owners for cost of straightening an axle.

The V. S. & P. R. R. Co. says that its understanding of Rule 5, Section 8, is that material (wheels and axles) shall be charged for at certain prices laid down in the rule, "with an additional charge of \$1.50 for *all labor* for each pair of wheels and axles removed from the truck." That under this understanding it has never made a charge for straightening an axle in addition to the charge of \$1.50, nor does it remember having received a bill prior to the one now in dispute for the labor of straightening an axle. It is admitted that an axle bent under ordinary service conditions is an owner's defect, and the road making the repairs may, if it so elects, replace such bent axle with a new or secondhand one, giving credit for the bent axle as scrap.

It is agreed to submit the matter to the Arbitration Committee for final disposition.

DECISION.

This comes under the Rules for 1896, and under Rule 3, Section 15, this is an owner's defect. It is true the rule would justify the replacement of the axle by another, but inasmuch as the bill would have been larger had that been done, the committee is of the opinion that the bill should be paid as rendered, especially as the car owner has not objected to the straightened axle being used.

ARBITRATION CASE NO. 518.

MANITOBA & NORTH-WESTERN RAILWAY COMPANY OF CANADA

VERSUS

CANADIAN PACIFIC RAILWAY COMPANY.

SIDE DOOR APPLIED AND CHARGED TO OWNER.

On January 20, 1897, box car 54, belonging to the Manitoba & North-Western Railway Company, was delivered to the Canadian Pacific Railway Company at the junction point at Portage la Prairie, loaded for Carman, Manitoba, distance 113 miles from said junction point. The car was inspected by the C. P. R'y at Portage la

Prairie and accepted without objection as in good order. The car was retained by the C. P. R'y Co., and the evidence shows that it was used in local traffic on that company's line, and was not returned to the owner until March 26, 1897, two months and six days after its delivery to the C. P. R'y. On March 23, three days prior to its return, a new side door was supplied to the car and bill for the cost rendered to the M. & N.-W. R'y Co. The C. P. R'y Co. says the new door was applied on account of the old door being missing, which was undoubtedly due to inferior fastening or ordinary wear and tear, and there is no evidence submitted to show that this car received other than fair usage while on the line of the C. P. R'y Co. It claims that it is justified in making charge for new door applied, and quotes Section 40, Rule 3, 1896, Code of Rules, and Arbitration Committee Decisions Nos. 382, 386 and 481.

The M. & N.-W. R'y Co. objects to the payment of bill, on the grounds that the car was in good order when delivered to the C. P. R'y, and that the door castings could not have been damaged sufficiently to admit of loss of the door with ordinary fair usage, it being admitted by the C. P. R'y Co. in the correspondence that the door could not have been lost if the castings had not been defective; that for several weeks prior to the loss occurring the car had been in use in local traffic on the C. P. R'y Co., and that the damage to the casting which occasioned the loss of the door must have occurred while the car was engaged in such traffic, the door being required only within three days prior to the return of car to the owner; that it is manifestly unfair to charge the car owner with a loss of this kind under these circumstances.

Failing to agree, the matter is submitted, by mutual consent, to the Arbitration Committee for decision.

DECISION.

Section 24 of Rule 3 reads as follows: "Locks, grain doors, and all inside or concealed parts of cars missing or damaged under fair usage, and failure or loss under fair usage of any part of the body of the car, except as provided for in Rule 5, Section 4."

The side door of a car is a part of the body of the car. The company making the repairs states that the door was missing due to fair usage, or ordinary wear and tear. There is no evidence submitted to show that the car had received any unfair usage.

In the opinion of the committee a charge by the Canadian Pacific Railway Company is in accordance with the M. C. B. Rules.

ARBITRATION CASE No. 519.

SWIFT REFRIGERATOR TRANSPORTATION COMPANY

versus

MISSOURI, KANSAS & TEXAS RAILWAY COMPANY.

CAR DESTROYED. BRAKE BEAMS AND CONNECTIONS TO BE RETURNED WITH TRUCKS.

On June 6, 1897, the Missouri, Kansas & Texas Railway Company damaged Swift Refrigerator Line car 1658, and authorized the Swift Refrigerator Transportation Company to bill for the value of the body, electing to return the trucks in good order. Bill covering depreciated value of the body was presented and paid; on

August 17, the S. R. T. Co. received the trucks belonging to this car, with certain defects to trucks and all brake beams and attachments missing. The M. K. & T. R'y Co. forwarded defect card covering certain of these defects, which did not include several items, relating particularly to the missing brake beams. The S. R. T. Co. communicated with the M. K. & T. R'y Co., requesting that card be forwarded for this missing material. The M. K. & T. R'y Co. replied, stating that the defect card, which they had previously furnished, along with equipment returned with the trucks, was all for which they were responsible, having already paid for car body.

S. K. T. Co. replied that, according to the decisions of the Arbitration Committee in cases 195, 348, 355 and 356, brake beams and attachments should be returned along with the trucks or authority given for bill, as they were not included with bill for body.

The M. K. & T. R'y Co. replies that it is its understanding that the brake beams and attachments, including brake levers and bottom connections, are to be returned with the trucks, but it has never returned safety or brake hangers. It also states that it does not consider the brake hangers or safety hangers a part of the brake equipment, and declines to issue card therefor; that if the S. R. T. Co. would cite a decision of the Arbitration Committee to that effect it would furnish card.

The S. R. T. Co. again refers to decisions of Arbitration Committee, citing particularly that portion of Case 195, which reads as follows: "In settling for destroyed equipment, the company desiring to return car complete, or either trucks or body separately in lieu of making payment in cash, must, under the rules, return the parts complete as originally constructed."

The S. R. T. Co. claims further that, as it billed the M. K. & T. R'y Co. for the body alone, it is entitled to replacement of all parts not included in the bill; that is, with the return of trucks, S. R. T. Co. should have defect card for the missing parts, including the items enumerated, namely: 8 brake hangers, 8 safety hangers, 8 safety hanger eyebolts, 8 brake hanger eyebolts.

The M. K. & T. R'y Co. further declines to issue defect card.

Thereupon the S. R. T. Co. renders bill for all items which it considers justly due it, which bill is declined until the four items enumerated shall have been eliminated, as the M. K. & T. R'y Co. positively declines to acknowledge the responsibility of the company destroying the car for these items.

Correspondence failing to settle the controversy, the case is, by mutual consent, referred to the Arbitration Committee.

Attention is called to the fact that this car had outside hung brakes, and the request made on the M. K. & T. R'y Co. was for eight brake hangers and eight safety hangers, with eyebolts which secure them to the brake beams; that the S. R. T. Co. called the attention of the M. K. & T. R'y Co. to the fact that there would doubtless be no question of responsibility for brake hangers and safety chains with inside hung brakes, and it would therefore appear it was justified in asking for them when the beams were outside hung. The S. R. T. Co. also claims, as a matter of equity, that it should be entitled to protection for all parts to the car complete, as originally constructed.

It not having been directly decided by the Arbitration Committee whether these particular items should be classed as parts of trucks or parts of body, the parties in

interest respectfully petition for a ruling on the subject for future guidance, as well as a ruling on the question of the liability of the M. K. & T. R'y Co. in this case.

DECISION.

In settling for destroyed cars, a price is given for trucks which includes "brake beams, complete, truck levers and bottom connection rod." No mention is made that outside and inside brakes are to be treated differently. In the case of inside brakes hung to the truck there could be no question but that all parts of the brake must be returned complete. If this is the intent of the rules in dealing with brakes hung to the trucks, the brake parts complete should also be returned when the brakes are hung to the body.

In the opinion of the committee the bill of the Swift Refrigerator Transportation Company is correct and should be paid.

A case in dispute between the Lake Shore & Michigan Southern Railway Company and the New York, Chicago & St. Louis Railroad Company over proper credits allowed for knuckle removed from an M. C. B. coupler was considered by the Arbitration Committee, and it was decided that the case was similar to Case 504, to which the parties to the dispute are referred.

CODE OF RULES

GOVERNING THE CONDITION OF, AND REPAIRS TO,
FREIGHT CARS FOR THE INTERCHANGE
OF TRAFFIC,

ADOPTED BY THE

MASTER CAR BUILDERS' ASSOCIATION.

REVISED AT SARATOGA, N. Y., JUNE, 1898.

PREFACE.

These rules make car owners responsible for, and therefore chargeable with, the repairs to their cars necessitated by ordinary wear and tear in fair service, so that defect cards will not be required for any defects thus arising.

Railroad companies handling cars are responsible for damage done to any car by unfair usage, derailment or accident, and for improper repairs made by them, and they should make proper repairs at their own expense, or issue defect card covering all such damage or improper repairs.

RULE 1.—CARE OF FOREIGN FREIGHT CARS.

Each railway company shall give to foreign cars, while on its line, the same care as to oiling, packing and inspection, that it gives to its own cars.

RULE 2.—INTERCHANGING FREIGHT CARS.

Cars offered in interchange must be accepted if in safe and serviceable condition, the receiving road to be the judge in cases not provided for in Rule 3.

RULE 3.—INSTRUCTIONS FOR INSPECTORS.

USE OF DEFECT CARD.

SECTION 1. Defect cards shall be $3\frac{1}{2}$ inches by 8 inches, and of the form shown below. They should be printed in red ink on both sides, and shall be filled in on both sides with ink or black indelible pencil. The cards must plainly specify in full each item for which charges are authorized.

M. C. B. DEFECT CARD.

(Name of Road.)

Car No. Date.

Initial Line.

Will be received at any point on this company's line with the following defects:

NOTE.—Fill in defects on both sides with ink or black indelible pencil. Attach this card with four tacks on outside face of intermediate sill, between cross-tie timbers.

.....

Inspector at.....

Send bill on this card to

Defect cards shall not be required for defects for which owners are responsible except for missing material on cars offered in interchange, as provided for in Section 28 of Rule 3; neither shall they be required of the delivering road for improper repairs that were not made by it, with the exception of the cases provided for in Sections 22, 29, 30, 31, 32 and 33 of Rule 3.

If a car has defects for which the owners are not responsible, but which do not render it unsafe to run, nor unsafe to trainmen, nor to any lading suitable to the car, the receiving road may require that a defect card be securely attached to the car with four tacks, preferably on the outside face of intermediate sill, between cross-tie timbers.

WHEELS.

DEFECTS OF WHEELS WHICH JUSTIFY RENEWAL.

SEC. 2. Shelled out: wheels with defective treads on account of pieces shelling out; if the spots are over $2\frac{1}{2}$ inches, or are so numerous as to endanger the safety of the wheel.

SEC. 3. Seams 1 inch long or over at a distance of $\frac{1}{2}$ inch or less from the throat of the flange, or seams 3 or more inches long on any other point of the tread.

SEC. 4. Worn through chill: when the worn spot exceeds $2\frac{1}{2}$ inches in length. Care must be taken to distinguish this defect from flat spots caused by sliding wheels.

SEC. 5. Worn flange: flanges having flat vertical surfaces extending more than 1 inch from tread, or flange 1 inch thick or less. (See Figs. 4 and 4 a.)

SEC. 6. Thick flange: flange over $1\frac{7}{8}$ inches thick. This does not apply to wheels cast prior to September 1, 1894. (See Fig. 2.)

SEC. 7. Tread worn hollow: if the tread is worn sufficiently hollow to render the flange or rim liable to breakage.

Owners responsible

- Owners responsible.
- SEC. 8. Burst: if the wheel is cracked from the wheel fit, outward, by pressure from the axle.
- SEC. 9. Broken flange, caused by seams, worn through chill or worn flange. See also Sec. 14.
- SEC. 10. Broken or chipped rim, caused by defective casting, if the tread, measured from the flange at a point $\frac{3}{8}$ inch above tread, is less than $3\frac{3}{4}$ inches in width. (See Fig. 5.) See also Sec. 14.
- SEC. 11. Cracked tread, cracked plate, one or more cracked brackets, or broken in pieces under fair usage. See also Sec. 14.
- SEC. 12. Wheels loose or out of gauge. (See Figs. 6 and 7.)
- SEC. 12 a. Chipped flange; if chip is on the outside of the flange and exceeds $1\frac{1}{2}$ inches in length and $\frac{1}{2}$ inch in width, or if it extends $\frac{1}{4}$ inch past the center of flange.
- Delivering Company responsible.
- SEC. 13. Flat sliding; if the spot caused by sliding is $2\frac{1}{2}$ inches or over in length. (Care should be taken to distinguish this defect from *worn through chill*.)
- SEC. 14. Broken flange, except as in Section 9; chipped flange, if chip is on throat side of flange, and exceeds $1\frac{1}{2}$ inches in length and $\frac{1}{2}$ inch in width, or if it extends $\frac{3}{8}$ inch past the center of flange; broken rim, if not caused by defective casting, if the tread, measured from the flange at a point $\frac{3}{8}$ inch above tread, is less than $3\frac{3}{4}$ inches in width (see Fig. 5), or any breakage caused by unfair usage, derailment or accident.

NOTE.—The determination of flat spots, worn flanges and chipped treads shall be made by a gauge as shown in Fig. 1. The determination of thick flanges shall be made by a gauge as shown applied to M. C. B. standard wheel tread and flange in Fig. 2.

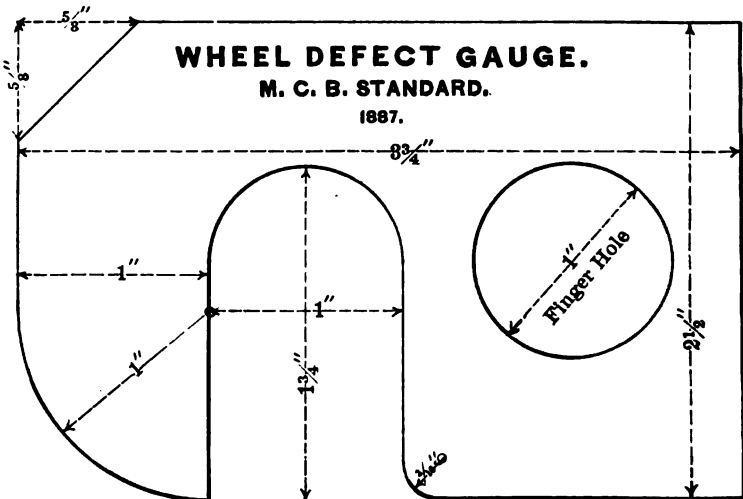
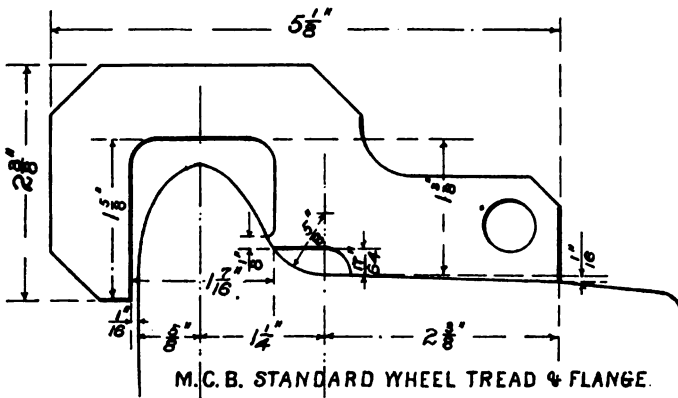


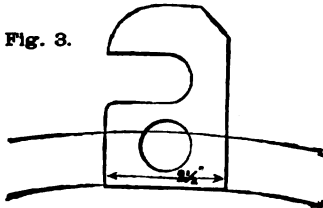
FIG. 1.



MAXIMUM FLANGE THICKNESS GAUGE.

FIG. 2.

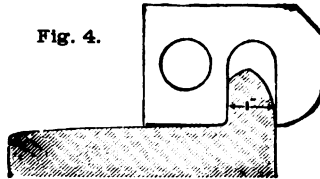
The following engravings of the wheel defect gauge, Fig. 1, show the method of using it:



METHOD OF GAUGING SHELLED AND
FLAT SPOTS.

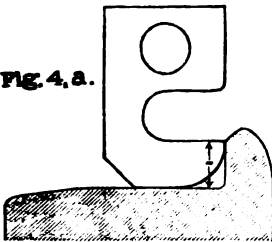
SEE RULE 3, SECS. 2 AND 13.

Fig. 4.



METHOD OF GAUGING WORN FLANGES.
SEE RULE 3, SEC. 5.

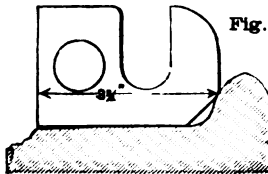
Fig. 4, a.



METHOD OF GAUGING WORN FLANGES.

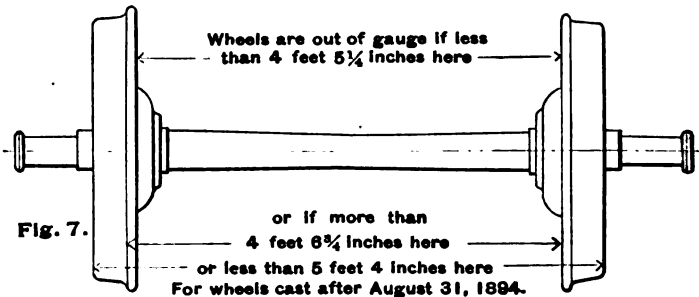
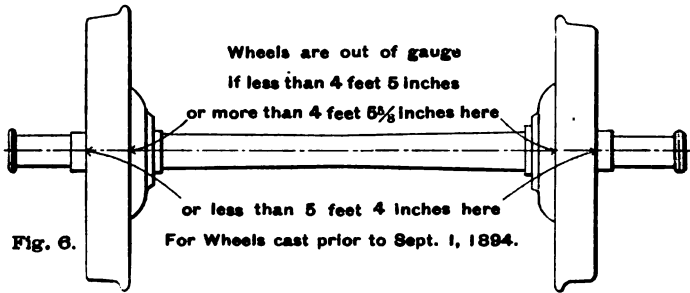
SEE RULE 3 SEC. 5.

Fig. 5.



METHOD OF GAUGING CHIPPED RIMS.

SEE RULE 3, SECS. 10 AND 14.



Measurements to be made at the same height on the wheels as the center of the axle.

AXLES.

DEFECTS OF AXLES WHICH JUSTIFY RENEWAL.

SEC. 15. Axles broken, or having seamy journals, or with collars broken or worn out, under fair usage.

SEC. 16. Axles less than the following prescribed limits:

CAPACITY OF CAR.	JOURNAL.	WHEEL SEAT.	CENTER.
100,000	5 inches.	$6\frac{3}{4}$ inches.	$5\frac{1}{2}$ inches.
80,000	$4\frac{1}{2}$ "	$6\frac{1}{4}$ "	$5\frac{1}{8}$ "
70,000	4 "	$5\frac{5}{8}$ "	$4\frac{7}{8}$ "
60,000	$3\frac{3}{4}$ "	5 "	$4\frac{3}{8}$ "
50,000	$3\frac{1}{2}$ "	$4\frac{3}{4}$ "	$4\frac{1}{8}$ "
40,000	$3\frac{1}{4}$ "	$4\frac{5}{8}$ "	$3\frac{7}{8}$ "
30,000	3 "	$4\frac{1}{4}$ "	$3\frac{1}{2}$ "
20,000	$2\frac{3}{4}$ "	$4\frac{1}{4}$ "	$3\frac{1}{2}$ "

All cars to have their capacity stenciled on them.

Owners
Company
responsible.

SEC. 17. Cut journals or axles bent or rendered unsafe by unfair usage, derailment or accident.

Delivering
Company
responsible.

TRUCKS.

DEFECTS OF TRUCKS WHICH JUSTIFY REPAIRS IF OWNERS ARE RESPONSIBLE, OR REPAIRS OR CARDING IF DELIVERING COMPANY IS RESPONSIBLE.

- SEC. 18. Defective, missing or worn-out parts of trucks not elsewhere provided for, which have failed under fair usage, or if any part of the truck frame or attachments is less than $2\frac{1}{2}$ inches above the top of the rail. } Owners responsible.
- SEC. 19. Damage of any kind to the truck due to unfair usage, derailment or accident. } Delivering Company responsible.
- Material missing from trucks of cars offered in interchange.

BRAKES.

DEFECTS OF BRAKES WHICH JUSTIFY REPAIRS.

- SEC. 20. Defective, missing or worn-out parts of brakes which have failed under fair usage, except on cars offered in interchange. } Owners responsible.
- NOTE.—Air-brake hose and fittings, angle cocks, cut-out cocks, triple valves, release valves and pressure retaining valves cannot be missing under fair usage.
- SEC. 21. Cylinder or triple valve of air-brake cars not cleaned and oiled within twelve months and the date of the last cleaning and oiling marked on the brake cylinder with white paint. }
- SEC. 22. If 1-inch hose and fittings are found on $1\frac{1}{4}$ -inch train pipe. } Delivering Company responsible.
- SEC. 23. Damage to any part of the brake apparatus caused by unfair usage, derailment or accident. }
- NOTE.—If the car has air-signal pipes or air-brake pipes, but no air brakes, the hose and couplings on the car are at owner's risk, unless the car is stenciled that it is so equipped.

BODIES.

DEFECTS OF BODIES WHICH JUSTIFY REPAIRS IF OWNERS ARE RESPONSIBLE, OR REPAIRS OR CARDING IF DELIVERING COMPANY IS RESPONSIBLE.

- SEC. 24. Locks, grain doors and all inside or concealed parts of cars missing or damaged under fair usage, and failure or loss under fair usage of any part of the body of the car, except as provided for in Rule 5, Section 4. }
- SEC. 25. Cars not within the limits of standard height for drawbars, $31\frac{1}{2}$ inches to $34\frac{1}{2}$ inches for standard gauge cars. } Owners responsible.
- SEC. 26. Steps, ladders, handholds or running boards in bad order or insecurely fastened, or absence of grabirons or handholds as required by law. Handholds or grabirons must be of wrought iron or steel and secured by bolts or lag screws. }
- SEC. 27. Damage of any kind to the body of the car due to unfair usage, derailment or accident. } Delivering Company responsible.
- SEC. 28. Material missing from body of cars offered in interchange, except locks, grain doors and all inside or concealed parts of car. }

Delivering
Company
responsible.

SEC. 29. M. C. B. couplers not equipped with steel or wrought-iron knuckles.

SEC. 30. Cars intended to be equipped with link-and-pin drawbars, if found with drawbars not fitting properly or not having sufficient strength.

Such drawbars washered out to proper length must be considered as fitting properly.

Such drawbars $1\frac{1}{2}$ inches longer than standard to the car must be considered as fitting properly.

SEC. 31. Cars intended to be equipped with M. C. B. couplers and so stenciled, if found with link-and-pin drawbars.

SEC. 32. Cars equipped with M. C. B. couplers having pocket rear end attachments and so stenciled, if found with tail-pin attachments instead of pocket.

SEC. 33. Uncoupling attachments of M. C. B. couplers, if inoperative when offered in interchange.

IMPROPER REPAIRS.

Company
making repairs
responsible.

SEC. 34. Any company making improper repairs is solely responsible to the owners, with the exception of the cases provided for in Sections 22, 29, 30, 31, 32 and 33 of Rule 3.

The company making such improper repairs shall place upon the car, at the time and place that the work is done, an M. C. B. defect card, which card shall state the wrong material used.

COMBINATIONS OF DEFECTS WHICH DENOTE UNFAIR USAGE IF CAUSED AT ONE AND THE SAME TIME AND AT THE SAME END OF CAR.

SEC. 35. Damaged coupler or drawbar, accompanied by damage to either drawbar stops, filling blocks, draft timbers or their substitutes, or end sill.

SEC. 36. Damaged drawbar pocket, spindle or their substitutes, accompanied by damage to either draft timbers or their substitutes, or end sill.

SEC. 37. Damaged drawbar stops or filling blocks, accompanied by damage to either coupler or drawbar, or end sill.

SEC. 38. Damaged draft timbers or their substitutes, accompanied by damage to either coupler or drawbar, drawbar pocket, spindle or their substitutes, or to end sill.

SEC. 39. Damaged wood or iron buffer blocks, accompanied by damage to end sill.

SEC. 40. Damaged end sill, accompanied by damage to either coupler or drawbar, drawbar pocket, spindle or their substitutes, drawbar stops, filling blocks, draft timbers or their substitutes, wood or iron buffer blocks, or longitudinal sills.

SEC. 41. Damaged longitudinal sills, accompanied by damage to end sill.

SEC. 42. Damaged longitudinal sills, if necessitating replacement or splicing of more than two sills.

SEC. 43. Damaged corner and end posts, if necessitating the replacement of or repairs to more than two end or two corner posts at one end, or more than one end and one corner post at same end of car.

NOTE.—The word "coupler" in the above sections, Nos. 35 to 43, inclusive, means the coupler body or knuckle.

RULE 4.—INSTRUCTIONS TO REPAIR MEN.

SECTION 1. Any car having defects which render it unsafe to run, unsafe to trainmen, or to any lading suitable to the car, may be repaired.

SEC. 2. Repairs to foreign cars shall be promptly made, and the work shall conform in detail to the original construction, and with the same quality of material originally used, except as hereinafter provided.

SEC. 3. In repairing damaged cars, M. C. B. standards may be used when of dimensions that do not impair the strength of the cars, in lieu of the parts forming its original construction.

SEC. 4. Any company finding a link-and-pin drawbar in a car intended to be equipped with an M. C. B. coupler, and so stenciled, and carded for wrong material, may replace the link-and-pin drawbar with an M. C. B. coupler.

SEC. 5. When M. C. B. couplers of another make are placed upon a car, the uncoupling arrangements shall be made operative at the expense of the company making the repairs.

When M. C. B. couplers, knuckles, metal brake beams, wheels or axles are replaced under conditions which make them chargeable to the owner, it must be plainly stated on the repair card and stub whether the material is new or secondhand.

SEC. 6. In replacing link-and-pin drawbars, cast-iron, wrought, malleable iron, or steel drawbars having either a pocket or spindle attachment, may be used when of sufficient strength and fitting properly.

SEC. 7. Any company finding cars not within the limits of standard height for drawbars may make repairs and charge to owners. Cars should be adjusted in height when empty, as far as possible, and in order to justify a bill for this work under the Rules of Interchange an empty car measuring $32\frac{1}{2}$ inches or less should be adjusted to $34\frac{1}{2}$ inches, or within one-quarter inch thereof, and when it is necessary to alter a loaded car it should be adjusted to $33\frac{1}{2}$ inches, or within one-quarter inch thereof, or as nearly as possible to such height as will bring it to $34\frac{1}{2}$ inches when the car is unloaded, the height to be measured from top of the rails to the center line of the drawbar shank.

SEC. 8. Center sills or draft timbers must not be spliced. All other sills may be spliced once. When the sills are less than 12 inches in depth the plan shown in Fig. 8 is to be followed:

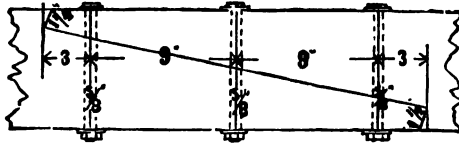


FIG. 8.

When the sills are 12 inches or more in depth the plan shown in Fig. 9 is to be followed:

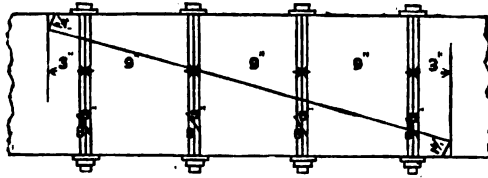


FIG. 9.

The splice may be located either side of body bolster, but the nearest point of any splice must not be within 12 inches of same. The splicing of two adjacent sills at the same end of the car, or the splicing of any sill between cross-tie timbers, will not be allowed.

SEC. 9. Wheels on the same axle must be of the same circumference.

SEC. 10. New wheels must not be mated with secondhand wheels.

SEC. 11. Prick-punching or shimming the wheel fit must not be allowed.

SEC. 12. The wheel seats of foreign axles must not be reduced more than $\frac{1}{8}$ inch to fit the wheels, and in no case must they be reduced below the limits given in Rule 3, Section 16.

SEC. 13. Any company repairing foreign cars with wrong material, and not in compliance with the sections of this rule, shall be liable to the owners for the cost of changing such car to the original standard, or to the requirements of this rule, except that companies applying axles smaller than the limits given in Section 16 of Rule 3 shall not be held responsible for improper repairs if the car is not stenciled showing the capacity of the car.

USE OF REPAIR CARD.

SEC. 14. When repairs of any kind are made to foreign cars a repair card shall be securely attached to outside face of intermediate sill between cross-tie timbers. This card shall specify fully the repairs made, and reason for same, the date and place where made, and name of road making repairs. The card shall be provided with a stub, which will duplicate the information on the card, and stubs must be forwarded with the bill.

If no bill is to be rendered, the repair card stub must be forwarded on or before the twentieth day of each month, with the words "no bill" written across the face of the repair card stub. In case it is not the inten-

tion to render bill, the words "no bill" shall be written across the face of the repair card.

The repair card shall be $3\frac{1}{2}$ by 8 inches, and the stub $3\frac{1}{2}$ by 4 inches. The card shall be printed on both sides in black ink, and shall be filled in on both sides with ink or black indelible pencil, and be of the following form:

<p style="text-align: center;">E. & L. Association—Repair Card Stub</p> <p>Car No. Initials</p> <p>Date</p> <p>Received following Repairs at</p> <p>Shops of the Ry. Co.</p> <p>(Insert Name)</p> <p>Inspector</p>	<p style="text-align: center;">E. & L. Association—Repair Card Stub</p> <p>Car No. Initials</p> <p>Date</p> <p>Received following Repairs at</p> <p>Shops of the Ry. Co.</p> <p>(Insert Name)</p> <p>Inspector</p>
<p style="text-align: center;">M. C. B. Association—REPAIR CARD</p> <p>Car No. Received following Repairs at the Shop of the</p> <p>Initials Railway Co.</p> <p>Date</p> <p>(Insert Name)</p> <p>REPAIRS MADE:</p> <p>WRT MADE:</p> <p>Inspector</p>	<p style="text-align: center;">M. C. B. Association—REPAIR CARD</p> <p>Car No. Received following Repairs at the Shop of the</p> <p>Initials Railway Co.</p> <p>Date</p> <p>(Insert Name)</p> <p>REPAIRS MADE:</p> <p>WRT MADE:</p> <p>Inspector</p>

When card is applied send stub at once to
(Insert the name of head of department.)

Inspector

This stub to be retained by company issuing card.

Inspector

Show reasons for making repairs noted on other side.

Inspector

The cards and stubs must state whether solid or filled journal bearings are applied or removed.

RULE 5.—INSTRUCTIONS FOR BILLING.

SECTION 1. Bills may be rendered for work done under Section 1 of Rule 4, except in cases where owners are not responsible and the car bears no defect card covering the defects repaired, stating upon the bill the date and place where the repairs were made; the repair card stub or defect card to accompany the bill.

SEC. 2. Car owners may require receipt of repair card or stub before payment of bill for repairs.

SEC. 3. When improper repairs of owner's defects have been made and bill rendered, the owner may counter bill against the company making the wrong repairs for the cost of changing the car to the original standard, or to the requirements of Rule 4 if the work is done.

SEC. 3 *a*. When improper repairs of defects for which owners are not responsible are made, the owner may make bill against the company making the improper repairs for the cost of changing the car to the original standard, or to the requirements of Rule 4 if the work is done.

SEC. 3 *b*. The evidence of a joint inspector or the joint evidence of two persons, one representing the owner of the car, and the other representing the delivering road, that the repairs are not proper, shall be final. A joint evidence card shall be used for this purpose, which shall be of the following form :

THE..... RAILWAY CO.

M. C. B. DEFECT CARD. Issued by.....R'y. At.....Date.....189.....

Inspector.....Reading as follows.....

.....

M. C. B. REPAIR CARD. Issued by _____ N'y. At _____ Date _____ 189____
Inspector _____ Reading as follows _____

.....

DISPOSITION OF CAR. Carded to.....Shop; Repaired: went forward without Repairs.

SEC. 6. Bills rendered for wheels and axles shall be in accordance with the following schedule of prices for material, with the proper debits and credits :

	NEW.	SECOND-HAND.	SCRAP.
One 36-inch wheel.....	\$8.00	\$6.00	\$4.00
One 33-inch wheel.....	6.50	5.00	3.00
One 30-inch wheel (or less)	5.50	3.00	2.50
One axle, 100,000 lbs	14.00	8.40	5.60
One axle, 80,000 lbs	12.00	7.20	4.80
One axle, 60,000 lbs	10.00	6.00	4.00
One axle, 50,000 lbs. (or under)	8.00	5.00	3.50

and with an additional charge of \$1.50 for all labor for each pair of wheels and axles removed from the truck. If new wheels and axles are substituted for secondhand wheels and axles, proper charges and credits shall be allowed, although such substitution be made on account of only one loose or defective wheel, or a defective axle, with the following exceptions: In case the owner of a car removes a damaged wheel or axle, no charge shall be made for any difference in value between the parts used and those removed that are not damaged.

When secondhand axles are applied under conditions which make them chargeable to the owners, the diameters of the journals of such axles applied should not be less than $\frac{1}{8}$ -inch above the limit dimensions given in Section 16, Rule 3.

If car owner elects on account of improper repairs to remove M. C. B. standard axles suitable to the capacity of the car, he shall allow credit for secondhand axles if they are in good order.

SEC. 7. Bills for wheel and axle work must make specific mention of each axle and wheel removed or applied.

SEC. 8. Bills which do not embody all the information called for by the headings of the columns may be declined until made to conform to the requirements of the rule. If no marks are found on wheels or axles removed, a notation to that effect must be made on face of bill.

SEC. 9. In noting on bills the cause of removal of wheels and axles, the terms used in Rule 3, Sections 2 to 14, shall be used, and the dimensions of the defect or variation from the prescribed limits should be carefully specified.

SEC. 10. Bills for repairs made under these rules and for material furnished shall be in conformity with schedules of prices and credits for the articles enumerated below :

MATERIAL.	CHARGE.	CREDIT.
Air-brake hose, 1½ inch, complete with fittings applied	\$2.00	.....
Air-brake hose, 1½ inch, credit for fittings for same		\$.80
Air-brake hose, 1 inch, complete with fittings applied	1.75	.....
Air-brake hose, 1 inch, credit for fittings for same		.80
Bolts, nuts, and forgings, finished	per lb. .03	¾c.
Castings, rough iron	.01½	½c.
" " malleable iron	.03	¾c.
" " steel	.05	¾c.
Chain	.05	.01
Door, for end of box or stock car, wooden, each, applied; no credit for scrap	1.75	.....
Door, for end of box or stock car, ventilated (wooden frame with iron rods), each, applied; no credit for scrap	3.00	.....
Door, for side of box or stock car, wooden, each, applied; no credit for scrap	3.50	.....
Door, for side of box or stock car, ventilated (wooden frame with iron rods), each, applied; no credit for scrap	5.00	.....
Door, for side of stock car, with iron rods, each, applied; no credit for scrap	4.00	.....
Half door, for side of box or stock car, each, applied	2.50	.....
Journal bearings of brass or bronze, lined or unlined, per lb., applied	.11	.08
Filled brass or bronze shell journal bearings, per lb., ap- plied	.08	.05
Labor, per hour	.20	.....
Lumber—yellow, white and Norway pine, poplar, oak, hick- ory and elm, dressed and framed, per ft. BM, required to make the part	.02½	.....
Nails	per lb. .03	.....
Steel for springs, rough	.04	¾c.
" helical springs	.03½	.01
Freight car paint, mixed	.05	.....

The weight charged for new journal bearings for 7-inch journals and over, but not 8 inches long, shall not exceed 10 pounds, and the weight charged for new journal bearings for journals 8 inches long and less than 9 inches long shall not exceed 13 pounds. The weight of scrap credited must be one-half the weight of the bearing charged.

NOTE.—Journal bearings having a lining ¼ inch thick or thicker, shall be charged as filled journal bearings, and not as lined journal bearings.

NOTE.—In rendering bills for owner's defects, the following should be observed:

No credit for scrap and no charge for labor shall be allowed in renewing brake shoes.

Whenever scrap credits are allowable the weights of scrap credited shall be equal to the weights of the new metal applied, except as otherwise provided in the rules, and except in the case of link-and-pin drawbars, and scrap M. C. B. couplers, and parts of same, and material applied on defect cards, in which cases the weight and kind of metal removed shall be credited.

Bills shall not be rendered for amounts less than 25 cents in aggregate, but charges for items less than 25 cents may be held until they amount to that sum, provided said aggregate is rendered within 60 days. No bill shall be returned for correction on account of error for less than 25 cents, but request shall be made for credits and adjustment in subsequent month.

All offices rendering bills should consolidate all charges against any one company into one monthly bill.

SEC. 11. M. C. B. couplers and parts of same of whatever make, when new, shall be billed as follows:

One coupler complete.....	\$7.50
One coupler shank.....	4.50
Other individual parts.....	3½ cents per pound

Credit for broken parts renewed shall be at rates given in Sections 10 and 12 of Rule 5.

SEC. 12. When M. C. B. coupler parts or metal brake beams are replaced, good secondhand material may be used, but they must be charged at seventy-five per cent of the prices when new. The credits for similar parts released from service in good condition must also be seventy-five per cent of the prices when new.

SEC. 13. Manufactured articles not included in the above list, must be charged at current market prices, without freight charges.

SEC. 14. When M. C. B. couplers are changed in Canada to replace wrong material, couplers may be charged at the prices fixed by the rules, plus the customs duty paid on entering Canada.

SEC. 15. No percentage to be added to either material or labor.

SEC. 16. Bills for the following work, to make cars conform to United States laws and to conform to the requirements of Section 7, Rule 4, must be rendered within 60 days after the work is done, and must state the height of the car before and after altering.

Altering height of one end of one car.....	\$1.00
Putting on one handhold or grabiron .....	.20

SEC. 17. The following table shows the number of hours which may be charged for labor in doing the various items of work enumerated, which includes all work necessary to complete each item of repairs, except in so far as labor is already included in charges for materials:

	Ordinary Cars.		Refrigerator Cars.	
	Hrs.	Charge for Labor.	Hrs.	Charge for Labor.
Arch bars, 1 or 2, replaced on same side of truck.....	3	\$.60	3	\$.60
Blacksmith shop, labor in repairing 1 arch bar....	2	.40	2	.40
1 bolster, body, composite, replaced.....	10	2.00	12	2.40
1 bolster, body, plain metal or wood, replaced....	8	1.60	10	2.00
1 bolster, body, plain metal or wood, replaced when one or more defective sills are replaced.....	2	.40	2	.40
1 bolster, composite, replaced, when one or more defective sills are replaced	4	.80	4	.80
1 bolster, truck, replaced.....	10	2.00	10	2.00
1 bolster, truck, and 1 spring plank in same truck, replaced.....	12	2.40	12	2.40
1 spring plank, replaced.....	10	2.00	10	2.00
1 platform plank, replaced.....	1	.20	1	.20
1 brake beam, replaced.....	2	.40	2	.40
Buffer blocks, cast-iron, each, replacing.....	1	.20	1	.20

	Ordinary Cars.		Refrigerator Cars.	
	Hrs.	Charge for Labor.	Hrs.	Charge for Labor.
Buffer blocks, wooden, replacing at one end of car	2	\$.40	2	\$.40
1 carlin, replaced	3	.60	..	....
1 center plate, replacing	2	.40	2	.40
2 " plates, " at same end	3	.60	3	.60
Center plate bolts, replacing, in part or all at one end	3	.60	3	.60
Column bolts, one or more, replaced in same truck	2	.40	2	.40
1 corner iron, replaced	1	.20	1	.20
1 cross-tie timber, replaced	2	.40	3	.60
1 cross-tie timber, replaced when one or more defective sills are replaced	1	.20	1	.20
1 draft timber, replaced	6	1.20	6	1.20
1 draft timber, replaced when its center sill has been replaced	1	.20	1	.20
2 draft timbers on same end, replaced	9	1.80	10	2.00
Draft timber bolts complete, at one end of car, replacing	3	.60	3	.60
1 drawbar, M. C. B. coupler or coupler body replaced	2	.40	2	.40
1 drawbar spring or drawbar, or both, replaced	2	.40	2	.40
1 or 2 drawbar stops at same end of car, replaced	2	.40	2	.40
All drawbar stops at one end of car, replaced	3	.60	3	.60
1 releasing rod for M. C. B. coupler, replaced	1/2	.10	1/2	.10
1 or 2 follower plates at same end of car, replaced	2	.40	2	.40
1 end plate, replaced	12	2.40	14	2.80
Rehanging old end door	1/2	.10	1	.20
" " side	1	.20	1	.20
1 end, corner, door or side post, replaced	3	.60	6	1.20
1 journal box, replaced	2	.40	2	.40
2 " boxes on same axle, replaced	3	.60	3	.60
1 center sill, replaced	32	6.40	44	8.80
2 center sills, replaced	38	7.60	65	13.00
1 end sill under siding, replaced	15	3.00	15	3.00
1 end sill outside siding, replaced	7	1.40	7	1.40
1 end sill under siding, replaced when one or more defective sills have been replaced	3	.60	3	.60
1 end sill outside siding, replaced when one or more defective sills have been replaced	2	.40	2	.40
1 intermediate sill replaced	29	5.80	40	8.00
2 " sills	35	7.00	56	11.20
3 " " "	41	8.20	66	13.20
4 " " "	47	9.40	76	15.20
1 inter. sill and 1 center sill replaced	38	7.60	60	12.00
1 " " " 2 " sills	44	8.80	81	16.20
2 " " " 1 " sill	43	8.60	70	14.00
2 " " " 2 " sills	50	10.00	91	18.20
3 " " " 1 " sill	48	9.60	80	16.00
3 " " " 2 " sills	60	12.00	101	20.20
4 " " " 1 " sill	60	12.00	90	18.00
4 " " " 2 " sills	65	13.00	111	22.20
1 intermediate sill, spliced	11	2.20	14	2.80
1 side sill and 1 center sill replaced	48	9.60	65	13.00
1 " " " 2 " sills	53	10.60	86	17.20
2 " sills " 1 " sill	68	13.60	86	17.20
2 " " " 2 " sills	71	14.20	107	21.40
1 " sill spliced	12	2.40	15	3.00
1 " sill replaced	25	5.00	44	8.80
2 " sills	40	8.00	65	13.00
1 " sill and 1 inter. sill replaced	44	8.80	60	12.00
1 " " " 2 " sills	50	10.00	70	14.00
1 " " " 3 " " "	56	11.20	80	16.00
1 " " " 4 " " "	62	12.40	90	18.00
2 " sills " 1 " sill	58	11.60	81	16.20
2 " " " 2 " sills	64	12.80	91	18.20
2 side sills and 3 inter. sills replaced	70	14.00	101	20.20

	Ordinary Cars.		Refrigerator Cars.	
	Hrs.	Charge for Labor.	Hrs.	Charge for Labor.
2 side sills and 4 inter. sills replaced.....	76	\$15.20	111	\$22.20
1 side, 1 inter. and 1 center sill replaced.....	53	10.60	81	16.20
2 " 1 " " " " " " " " " "	74	14.80	102	20.40
2 " 2 " " " " " " " " "	58	11.60	91	18.20
2 " 2 " " " " " " " " "	76	15.20	112	22.40
2 " 3 " " " " " " " " "	63	12.60	101	20.30
2 " 3 " " " " " " " " "	81	16.20	122	24.40
2 " 4 " " " " " " " " "	68	13.60	111	22.20
2 " 4 " " " " " " " " "	86	17.20	132	26.40
2 " 1 " " 2 " " sills " " "	58	11.60	102	20.40
2 " 1 " " 2 " " " " " " "	76	15.20	123	24.60
1 " 2 " " 2 " " " " " " "	63	12.60	112	22.40
1 " 3 " " 2 " " " " " " "	69	13.80	122	24.40
1 " 4 " " 2 " " " " " " "	74	14.80	132	26.40
2 " 2 " " 2 " " " " " " "	81	16.20	133	26.60
2 " 3 " " 2 " " " " " " "	86	17.20	143	26.60
2 " 4 " " 2 " " " " " " "	91	18.20	153	30.60
Each side or inter. sill spliced, when other sills have to be replaced as above.....	6	1.20	7	1.40
1 truck spring replaced.....	2	.40	2	.40
1 truck transom, wood, replaced.....	10	2.00	10	2.00
1 side plank renewed on gondola car.....	4	.80		
2 " planks " " same side.....	5 1/2	1.10		
3 " " " " " " " " " " " "	7	1.40		
1 end plank " " gondola car.....	2	.40		
2 " planks " " same end.....	2 1/2	.50		
3 " " " " " " " " " " " "	3	.60		
1 side plate applied.....	15	3.00	25	5.00
1 " " spliced.....	8	1.60	15	3.00
1 running board, complete, applied.....	6	1.20	6	1.20
Head center pin applied, empty car.....	1/2	.10	1/2	.10
" " " " loaded ".....	3	.60	3	.60
" " " " empty ".....	1 1/2	.30	1 1/2	.30
" " " " loaded ".....	1 1/2	.30	1 1/2	.30

NOTE.—An additional charge of 75 cents shall be allowed in replacing intermediate or center sills on cars equipped with air brakes.

No charge to be made for labor of replacing or applying M. C. B. knuckles, knuckle pins, locking pins, clevises, brake shoes or brake-shoe keys.

When it is necessary to apply an M. C. B. coupler complete, on account of a broken or missing knuckle, the usual labor charge for replacing a coupler can be made.

No additional labor to be charged for applying center pin or friction rollers when center plate bolts or center plates are renewed on same end of car.

SEC. 18. The following table shows the labor charges allowable, in cents, for the items named in air-brake work :

Angle cock, renewing	5
Angle cock, handle, renewing	5
Coupling, dummy, applying	5
Cut-out cock, renewing	15
Cut-out cock, handle, renewing	5
Cylinder body or reservoir, or both, renewing	25
Cylinder and reservoir, tightening when loose	10
Cylinder release spring, renewing	10
Cylinder gasket, renewing	20
Check valve case, renewing	10
Check valve case gasket	10

Gasket, coupling, renewing.....	3
Pipe, renewing one section.....	10
Pipe, securing to body.....	10
Pipe nipple on end of train pipe renewed.....	5
Piston, renewing.....	10
Piston, packing leather, renewing.....	15
Pressure-retaining valve, repairing.....	15
Release valve, repairing.....	10
Release valve rod, repairing.....	10
Strainer, renewing.....	5
Triple slide valve, repairing.....	40
Triple emergency valve seat, repairing.....	10
Triple valve gasket, renewing.....	10
Triple valve cleaned and oiled.....	10
Cylinder cleaned and oiled.....	15

SEC. 19. The settlement prices of new eight-wheel cars shall be as follows, with an addition of \$36 for each car equipped with air brakes. The road destroying a car with air brakes may elect to return the air-brake apparatus, including such attachments as are usually furnished by the air brake manufacturer, complete and in good condition.

BODIES.

Wood or Iron.

Box car, eight-wheel, 36 feet long or over, but under 40 feet....	\$325.00
Box car, eight-wheel, 34 feet long or over, but under 36 feet long	300.00
Box car, eight-wheel, 32 feet long or over, but under 34 feet long	275.00
Box car, eight-wheel, under 32 feet long	240.00
Flat car, eight-wheel, plain, 32 feet long or over.....	125.00
Flat car, eight-wheel, plain, under 32 feet long	100.00
Gondola car, eight-wheel, drop-bottom, 30 tons or over, but under 40 tons.....	275.00
Gondola car, eight-wheel, drop-bottom, 25 tons or over, but under 30 tons.....	250.00
Gondola car, eight-wheel, drop-bottom, 20 tons or over, but under 25 tons.....	220.00
Gondola car, eight-wheel, drop-bottom, under 20 tons	180.00
Gondola car, eight-wheel, hopper-bottom, 30 tons or over, but under 40 tons.....	300.00
Gondola car, eight-wheel, hopper-bottom, 25 tons or over, but under 30 tons.....	275.00
Gondola car, eight-wheel, hopper-bottom, 20 tons or over, but under 25 tons	240.00
Gondola car, eight wheel, hopper-bottom, under 20 tons	200.00
Gondola car, eight-wheel, plain, 32 feet long or over	150.00
Gondola car, eight-wheel, plain, under 32 feet long	125.00
Stock car, eight-wheel, 34 feet long or over.....	300.00
Stock car, eight-wheel, 32 feet long or over, but under 34 feet ..	275.00
Stock car, eight-wheel, under 32 feet long	240.00

NOTE.—The lengths of cars above mentioned refer to the lengths over the end sills.

When cars of 60,000 pounds capacity or over and so stenciled, have trucks with journals 4 inches or over in diameter when new, \$25 per car shall be added to the figures as given above for the values of car bodies.

TRUCKS.

60,000 lbs. capacity or under, with wood bolster, per pair	\$175.00
60,000 lbs. capacity or under, all metal, per pair	230.00
80,000 lbs. capacity or under, but over 60,000 lbs., all metal, per pair	255.00
100,000 lbs. capacity or under, but over 80,000 lbs., all metal, per pair	280.00

Prices include brake beams complete, truck levers, dead lever guides and bottom connection rods.

FOUR-WHEEL CARS.

Coal car, ordinary, complete	\$200.00
Box car, complete	230.00
Gondola car, drop-bottom, complete	300.00

SEC. 20. Depreciation due to age shall be estimated at six per cent per annum upon the yearly depreciated value of the bodies and trucks only; provided, however, that allowances for depreciation shall in no case exceed sixty per cent of the value new. The amount, \$36, for air brakes shall not be subject to any depreciation.

SEC. 21. Refrigerator cars, special stock cars and other freight cars, designed for special purposes, not referred to above, shall be settled for at the present cost price, as may be agreed to by the parties in interest, less the deduction for depreciation due to age, which shall be on the same basis as for regular freight equipment.

SEC. 22. In rendering bills, cars shall be treated as belonging to companies or individuals whose name or initials they bear, except in case of Line Cars where the equipment list of the general officers of the Line designates a party to make settlement.

SEC. 23. Switching roads will only be allowed to render bills against car owners for the following defects made and repaired by them: Roof lost on account of decay or faulty construction, broken truck springs, truck transoms, arch bars; column bolts, truck hangers, truck transom truss rods, truck bolsters, truck bolster truss rods, oil boxes, spring planks, truck hanger pins, side bearings and center plates, provided the damage has not been caused by derailment or rough usage. They will be allowed to render bills direct against car owners on all car owners' defects on cars received by them from a railroad company, provided they procure joint evidence from the delivering road that such car owners' defects existed when the car was delivered by the railroad company; joint evidence to accompany the bill against the car owner.

A switching road is a corporation doing the major part of its business on a switching charge, or one which does not pay mileage for handling cars.

RULE 6.— DESTROYED CARS AND THE RETURN OF TRUCKS.

SECTION 1. The company on whose line the bodies or trucks are destroyed shall report the fact to the owner not later than 30 days after their destruction, and shall have its option whether to rebuild or settle for the same.

SEC. 2. If the company on whose lines the car is destroyed elects to rebuild either body or trucks, or both, the original plan of construction must be followed, and the original kind and qualities of materials used. The rebuilding must be completed within 60 days from the original date of damage or destruction. In such cases no allowance shall be made for betterments.

SEC. 3. If only the body of a car is destroyed, and the company destroying it elects to return the trucks, they shall be put in good order, or accompanied by a defect card, covering all defects or improper repairs made by them for which owners are not responsible, and forwarded, within 60 days, free of freight or other charges, to the nearest point on the line of the company owning or operating the car, and the number, line and class of car destroyed shall be stenciled or painted on each truck so returned.

SEC. 4. For the mutual advantage of railway companies interested, the settlement for a car owned or controlled by a railway company, when damaged or destroyed upon a private track, shall be assumed by the railway company delivering the car upon such tracks.

RULE 7.—SENDING HOME WORN-OUT AND DAMAGED CARS.

SECTION 1. A car unsafe to load on account of general worn-out condition, due to age or decay, shall be reported to its owner, who must be advised of all existing defects. If the owner elects to have it sent home, he shall furnish two home cards, noting upon them existing defects and the route over which the car is to be returned to its owner. If the route coincides with that over which the car passed to the point where it became unserviceable, no liability shall be incurred as between the owner and the road handling the car, either for freight charges in handling the car or for car service during this movement.

Such cards shall be attached to each side of the body of the car. They shall be $3\frac{1}{2}$ by 8 inches, and of the form shown below. They shall be printed on both sides, and shall be filled in on both sides with ink or black indelible pencil :

FROM	
.....	R. R.
TO	
.....	R. R.
VIA	
.....	
.....	
To be shopped for	
.....	
.....	
.....	
(Head of Car Department.)	

SEC. 2. A car which is safe to run, but unsafe to load on account of serious damage caused by wreck or accident, may be reported to the owners and disposed of as provided in Section 1, if the owner so elects.

SEC. 3. In case of private line cars, the cars shall be regularly billed home, and the owner notified.

RULE 8.—FURNISHING MATERIALS.

Companies shall promptly furnish to each other, upon requisition, and forward free over their own road, material for repairs of their cars injured upon foreign lines that cannot be procured in open market. Requisition for such material shall state that it is for repairs of cars, and shall give the number and lettering of such cars and pattern number of castings required when possible.

RULE 9.—FURNISHING DUPLICATE CARDS.

Duplicate defect and repair cards shall be furnished for lost or illegible cards.

RULE 10.—CONDITIONS OF ACCEPTANCE OF THIS CODE.

SECTION 1. Any car owner or railway company may become a party to this Code of Rules by giving notice through one of its general officers to the Secretary of the Master Car Builders' Association.

SEC. 2. Any car owner or railway company that is a party to this Code of Rules shall be bound by same through its successive revisions, until one of its general officers files with the Secretary of the Master Car Builders' Association its notification of withdrawal.

SEC. 3. Acceptance or rejection of this Code of Rules must be as a whole, and no exception to an individual rule or rules shall be valid.

RULE 11.—SETTLEMENT OF DISPUTES.

In order to settle disputes arising under the rules, and to facilitate the revision of the rules at the annual conventions of the Association, an Arbitration Committee of five representative members shall be appointed annually by the Executive Committee; three members of this committee to constitute a quorum.

In case of any dispute or question arising under the rules between the subscribers to said rules, the same may be submitted to this committee through the Secretary, in abstract jointly, said abstract setting forth the point or points at issue, and each party's interpretation of the rules upon which its claim is based, clearly and concisely, not exceeding three typewritten pages of letter size, single space, which shall be signed by both parties to the dispute. Should one of the parties refuse or fail to furnish the necessary information, the committee shall use its judgment as to whether, with the information furnished, it can properly give its opinion. The decisions of the committee shall be final and binding upon the parties concerned. This committee shall report its decisions to the Association, and its report shall be incorporated in the annual report of proceedings of the Association.

RULE 12.—REVISION OF THIS CODE OF RULES.

SECTION 1. The Arbitration Committee shall ask for suggestions of changes, amendments and additions to these rules prior to each annual convention, which it shall consider, and it shall report its recommendations to the succeeding annual convention.

SEC. 2. In the revision of these rules by the Association, a two-thirds vote shall be necessary for adoption.

SEC. 3. Voting powers shall be the same as prescribed in the Constitution of the Master Car Builders' Association on matters pertaining to the adoption of standards and the expenditure of money.

SEC. 4. This Code of Rules shall be introduced for discussion and revision at one session of the Master Car Builders' Association convention each year.

RULE 13.

This Code of Rules shall take effect September 1, 1898.

LIST OF CAR OWNERS AND RAILWAY COMPANIES

WHICH HAVE ADOPTED THE CODE OF RULES GOVERNING THE
CONDITION OF, AND REPAIRS TO, FREIGHT CARS FOR THE
INTERCHANGE OF TRAFFIC.

The following is a complete list of car owners and railway companies which have given notice of the adoption of the above Code of Rules.

Other companies which adopt this Code of Rules should notify the Secretary in accordance with the Rules, so that the names of such companies may be included in the list thereafter. Notice should be given of all changes in the names of companies in this list.

Alabama Great Southern.
Alabama & Vicksburg.
Allegheny Valley.
American Cotton Oil Co.
American Refrigerator Transit Co.
American Tank Line.
Ann Arbor.
Armour Car Lines.
Armour Packing Co.
Atchison, Topeka & Santa Fe.
Atlanta, Knoxville & Northern.
Atlanta Stone, Coal & Lumber Line.
Atlanta & Florida.
Atlantic & Danville.
Atlanta & West Point.
Baltimore & Ohio.
Baltimore & Ohio South-Western.
Baltimore & Potomac.
Barberton Belt.
Bay Terminal.
Beech Creek.
Bennington & Rutland.
Boston & Albany.
Boston & Lowell.
Boston & Maine.
Boston, Hoosac Tunnel & Western.
Brainerd & Northern Minnesota.
Bristol, Elizabethton & North Carolina.
Buffalo, Rochester & Pittsburgh.
Buffalo, St. Marys & South-Western.

Buffalo & Susquehanna.
Burlington, Cedar Rapids & Northern.
Burlington & Missouri River in Nebraska.
Burton Stock Car Co.
Butte, Anaconda & Pacific.
Cairo, Vincennes & Chicago.
California Fruit Transportation Co.
Cammal & Black Forest.
Canada Southern.
Canadian Pacific.
Canda Cattle Car Co.
Carolina Central.
Cape Fear & Yadkin Valley.
Cape Girardeau South-Western.
Central R. R. & Banking Co. of Ga.
Central Railroad of New Jersey.
Central Vermont.
Champaign & Havana.
Chattanooga, Rome & Columbus.
Chattanooga Southern.
Chesapeake, Ohio & South-Western.
Chesapeake & Ohio.
Chesapeake & Western.
Chicago, Burlington & Kansas City.
Chicago, Burlington & Northern.
Chicago, Burlington & Quincy.
Chicago, Fort Madison & Des Moines.
Chicago Great Western.
Chicago Junction.
Chicago, Lake Shore & Eastern.

Chicago, Milwaukee & St. Paul.	Detroit, Grand Rapids & Western.
Chicago, New York & Boston Refrigerator Co.	Detroit, Toledo & Milwaukee.
Chicago, Peoria & St. Louis.	Detroit & Lima Northern.
Chicago, Rock Island & Pacific.	Detroit & Mackinac.
Chicago, St. Louis & Pittsburgh.	Des Moines & Fort Dodge.
Chicago, St. Paul, Minneapolis & Omaha.	Des Moines & Northern.
Chicago & Alton.	Dolese & Shepard.
Chicago & Calumet Terminal.	Duluth & Iron Range.
Chicago & Eastern Illinois.	Duluth, South Shore & Atlantic.
Chicago & Erie.	Durham & Northern.
Chicago & Iowa.	East St. Louis Connecting.
Chicago & Northern Pacific.	East & West.
Chicago & North-Western.	Elgin, Joliet & Eastern.
Chicago & South Bend.	Elmira, Cortland & Northern.
Chicago & West Michigan.	Erie & Wyoming Valley.
Chicago & Western Indiana and Belt Railway	Evansville & Terre Haute.
Choctaw, Oklahoma & Gulf.	Express Coal Line.
Cincinnati, Hamilton & Dayton.	Fairbank Co., The N. K.
Cincinnati, Selma & Mobile.	Fall Brook.
Cincinnati Southern.	Findlay, Ft. Wayne & Western.
Cincinnati, New Orleans & Texas Pacific.	Fitchburg.
Cleveland, Akron & Columbus.	Flint & Pere Marquette.
Cleveland, Cincinnati, Chicago & St. Louis.	Florida Central & Peninsular.
Cleveland & Marietta.	Fort Worth & Denver City.
Cleveland, Canton & Southern.	Galveston, Harrisburg & San Antonio.
Cleveland, Lorain & Wheeling.	Geneva, Ithaca & Sayre.
Cleveland Terminal & Valley.	George's Creek & Cumberland.
Clove Branch.	Georgia.
Colorado Midland.	Georgia, Carolina & Northern.
Columbus, Hocking Valley & Toledo.	Georgia Southern & Florida.
Columbus, Sandusky & Hocking.	Grand Rapids & Indiana.
Connecticut River.	Grand Trunk R'y System.
Consolidated Cattle Car Co.	Great Northern Railway Line.
Consolidated Rolling Stock Co.	Gulf, Colorado & Santa Fe.
Cornwall.	Gulf, Western Texas & Pacific.
Cornwall & Lebanon.	Hannibal & St. Joseph.
Craig Oil Co.	Hartford & Connecticut Western.
Cudahy Refrigerator Line.	Housatonic.
Cumberland Valley.	Houston & Texas Central.
Cumberland & Pennsylvania.	Huntington & Broad Top Mountain.
Delaware, Lackawanna & Western.	Illinois Central.
Delaware, Susquehanna & Schuylkill.	Indiana, Bloomington & Western.
Delaware & Hudson Canal Co.	Indianapolis, Decatur & Western.
Denver & Rio Grande.	Intercolonial of Canada.
	International & Great Northern.
	Iowa Central.
	Iowa, Indiana & Illinois.

- Iron Car Express Coal Line.
 Jacksonville, St. Augustine & Indian River.
 Jacksonville, Tampa & Key West.
 Jacksonville & St. Louis.
 Jacob Dold Packing Co.
 Kanawha & Michigan.
 Kansas City, Fort Scott & Memphis.
 Kansas City, St. Joseph & Council Bluffs.
 Keokuk & Western.
 Lake Champlain & Moriah.
 Lake Erie & Detroit River.
 Lake Erie & Western.
 Lake Shore & Michigan Southern.
 Leavenworth, Kansas & Western.
 Lehigh Valley.
 Lexington & Eastern.
 Lipton Car Lines.
 Litchfield, Carrollton & Western.
 Louisville, Evansville & St. Louis.
 Louisville, New Albany & Chicago.
 Louisville & Nashville.
 Louisville, New Orleans & Texas.
 Louisville, St. Louis & Texas.
 Louisville & St. Louis.
 Madison, Alton & Chicago.
 Mahoning Valley.
 Maine Central.
 Manhattan Oil Co.
 Manitoba & North-Western Railway of Canada.
 Martin, John C.
 Mason City & Fort Dodge.
 Mexican Central.
 Mexican Northern.
 Michigan Central.
 Milwaukee, Lake Shore & Western.
 Missouri Pacific.
 Minneapolis, St. Paul & Sault Ste. Marie.
 Minneapolis & St. Louis.
 Missouri, Kansas & Texas.
 Montana Union.
 Mobile & Ohio.
 Nashville, Chattanooga & St. Louis.
 National Car Co.
 National Rolling Stock Co.
 Nelson Morris & Co.
 Newburgh, Dutchess & Connecticut.
 New Orleans & North-Eastern.
 Newport News & Mississippi Valley.
 New York Central & Hudson River.
 New York & Northern.
 New York, Chicago & St. Louis.
 New York, Lake Erie & Western.
 New York, New Haven & Hartford.
 New York, Ontario & Western.
 New York, Philadelphia & Norfolk.
 New York, Pennsylvania & Ohio.
 New York, Providence & Boston.
 New York & New England.
 New York, Susquehanna & Western.
 New York, Texas & Mexican.
 Norfolk Southern.
 Norfolk & Carolina.
 Norfolk & Western.
 Northern Central.
 Northern Pacific.
 Old Colony.
 Ohio Southern.
 Ohio & Mississippi.
 Ogdensburg & Lake Champlain.
 Omaha & St. Louis.
 Oregon Railroad & Navigation Co.
 Pennsylvania Company.
 Pennsylvania Railroad.
 Pennsylvania, Poughkeepsie & Boston.
 Peoria, Decatur & Evansville.
 Petersburg.
 Philadelphia & Reading.
 Philadelphia, Reading & New England.
 Philadelphia, Wilmington & Baltimore.
 Pittsburgh, Akron & Western.
 Pittsburgh, Chartiers & Youghiogheny.
 Pittsburgh, Cincinnati, Chicago & St. Louis.
 Pittsburgh, Bessemer & Lake Erie.
 Pittsburgh & Eastern.
 Pittsburgh & Lake Erie.
 Pittsburgh & Western.
 Plant System.
 Pontiac, Oxford & Northern.
 Providence & Worcester.
 Provision Dealers' Despatch.
 Raleigh & Augusta Air Line.

Raleigh & Gaston.	Terre Haute & Indianapolis.
Richmond, Fredericksburg & Potomac.	Texas & New Orleans.
Rio Grande Western.	Texas Central.
Rock Island & Peoria.	Texas Pacific.
Rome, Watertown & Ogdensburg.	Toledo, Cincinnati & St. Louis.
Roanoke & Tar River.	Toledo, Columbus & Cincinnati.
Rutland.	Toledo, Peoria & Western.
Saginaw Valley & St. Louis.	Toledo, St. Louis & Kansas City.
Santa Fe Pacific.	Toledo & Ohio Central.
Santa Fe, Prescott & Phoenix.	Toledo & Ohio Central Extension.
Scioto Valley.	Toronto, Gray & Bruce.
Seaboard & Roanoke.	Toronto, Hamilton & Buffalo.
Seattle & International.	Troy & Boston.
Shenandoah Valley.	Tyler South-Eastern.
Sherman, Shreveport & Southern.	Union Pacific.
Sioux City & Northern.	Union Pacific, Denver & Gulf.
South Atlantic & Ohio.	Union Stock Yards & Transit Co. of
South Carolina.	Chicago.
South-Eastern Line.	Union Stock Yards Co. of Omaha.
South Florida.	Union Tank Line.
Southern.	United Counties.
Southern Central.	Vicksburg, Shreveport & Pacific.
Southern Freight Line.	Vinton Colliery Co.
Southern Iron Car Line.	Virginia Midland.
Southern Pacific (Pacific System).	Wabash Railway.
Spokane Falls & Northern.	Washington Southern.
St. Joseph & Grand Island.	Wheeling & Lake Erie.
St. Louis, Chicago & St. Paul.	Western Car Co.
St. Louis, Kansas City & Colorado.	Western Maryland.
St. Louis, Keokuk & North-Western.	Western Railway of Alabama.
St. Louis & Hannibal.	Western New York & Pennsylvania.
St. Louis & San Francisco.	Western Rolling Stock & Equipment Co.
St. Louis Refrigerator Car Co.	West Jersey & Sea Shore.
St. Louis South-Western.	West Shore.
St. Louis South-Western Railway of	West Virginia Central & Pittsburgh.
Texas.	Wilmington, Columbia & Augusta.
St. Louis Transfer.	Wilmington & Northern.
St. Paul & Duluth.	Wilmington & Weldon.
Staten Island Rapid Transit.	Wisconsin Central.
Street's Western Stable Car Line.	Zanesville & Ohio River.
Sydney & Louisburg.	

APPENDIX.

CODE OF RULES

Governing the Condition of, and Repairs to, Passenger Equipment Cars in Interchange.

1. Each railway company shall give to foreign cars, while on its line, the same care and attention that it gives its own cars, except in case of cars on which work is done under special agreement existing between the company owning the cars and the road operating the same.

2. Cars must be delivered in good running order, and returned in as good general condition as when received.

3. The receiving road is authorized to make such alterations and repairs as are necessary for the safe movement of cars over its line, and must immediately notify the delivering road of all such alterations and repairs, upon receipt of which notification the delivering road shall furnish proper authority to render bill for such alterations and repairs.

4. Authority must be furnished for the replacement of wheels and axles if in the following condition :

WHEELS.

(a) Loose wheels.

(b) Variation from gauge beyond the limits as prescribed in the Rules of Interchange for freight cars.

WHEELS, CAST-IRON.

(a) Shelled out, with treads defective on account of circular pieces shelling out, leaving round, flat spots, deepest at the edges, with raised centers, if $1\frac{1}{4}$ inches or more in diameter.

(b) Tread worn hollow; if tread is worn sufficiently hollow to render flange or rim liable to breakage.

(c) Worn flange; flanges having flat, vertical surfaces, extending more than $\frac{3}{4}$ inch from tread.

(d) Flat spots; if flat spots, caused by sliding, exceed $1\frac{1}{4}$ inches in length.

(e) Burst; if wheels are cracked from the wheel fit outward by pressure from the axle.

(f) Flanges, rim, tread, plate or brackets, either cracked, chipped or broken in any manner.

WHEELS, STEEL-TIRED.

(a) Loose, broken or cracked hubs, plates, bolts, retaining ring or tire.

(b) Worn flange or tire; with flanges less than $\frac{3}{4}$ inch thick, or having flat, vertical surfaces extending more than $\frac{3}{4}$ inch from tread, or with tire thinner than shown in Fig. 1.

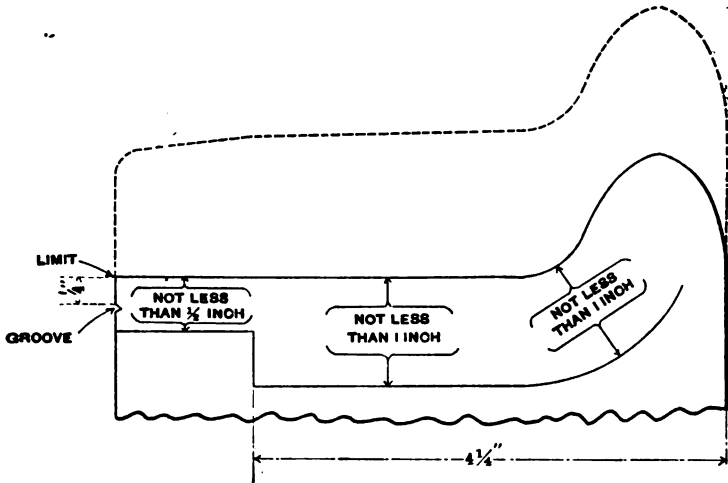


FIG. 1.

(c) Flat spots; if flat spots, caused by sliding, exceed $1\frac{1}{4}$ inches in length.

AXLES.

Axles bent or broken, or having journals cut or less than $3\frac{1}{2}$ inches in diameter.

5. Brakes must be in perfect working order (adjustment based on seventy pounds as the initial pressure), with a piston travel of not less than 5 inches, nor more than 8 inches.

6. Bills for wheels and axles shall be of the following form, and must make specific mention of each wheel and axle removed or applied :

	NEW.	SECOND-HAND.	SCRAP.
1 36-inch Cast Wheel	\$8.00	\$6.00	\$4.00
1 33-inch Cast Wheel	6.50	5.00	3.00
1 axle, 60,000 lbs	10.00	6.00	4.00
1 axle, 40,000 lbs	8.00	5.00	3.50

7. Bills rendered for labor and material furnished shall be in accordance with the following prices, with the proper debits and credits :

	NEW.	CREDIT FOR SCRAP.
Journal Bearings.....per lb.	11 cents.	8 cents.
Malleable Iron	3 "	$\frac{3}{4}$ "
Bolts, Nuts, Wrought Washers and all Wrought Iron except Axles.....	3 "	$\frac{3}{4}$ "
Castings.....	$1\frac{1}{2}$ "	$\frac{1}{2}$ "
Spring Steel (not Springs).....	4 "	$\frac{3}{4}$ "
Lumber: Oak, Pine, Poplar, Hickory and Elm.....per ft.	$2\frac{1}{2}$	
Labor	25 c. per hour.	

LIST OF RAILROAD COMPANIES.

The following is a complete list of the railroad companies which have given notice of the adoption of the Code of Rules for the interchange of passenger equipment cars :

Atlanta & Florida.	Lehigh Valley.
Atlantic & Danville.	Manitoba & North-Western Railway of Canada.
Baltimore & Ohio.	Mason City & Fort Dodge.
Butte, Anaconda & Pacific.	Missouri Pacific.
Cairo, Vincennes & Chicago.	Nashville, Chattanooga & St. Louis.
Cape Fear & Yadkin Valley.	New York, Lake Erie & Western.
Chesapeake & Ohio.	Northern Pacific.
Chicago & Erie.	Oregon Railway & Navigation Co.
Chicago & North-Western.	Pennsylvania, Poughkeepsie & Boston.
Chicago & West Michigan.	Philadelphia & Reading.
Chicago, Burlington & Kansas City.	Pittsburgh & Western.
Chicago, Burlington & Quincy.	Plant System.
Chicago, Rock Island & Pacific.	Rio Grande Western.
Cincinnati, Hamilton & Dayton.	Rock Island & Peoria.
Cincinnati, New Orleans & Texas Pacific.	Sioux City & Northern.
Cleveland, Cincinnati, Chicago & St. Louis.	South Florida.
Cleveland, Lorain & Wheeling.	Southern.
Cleveland Terminal & Valley.	Southern Pacific Company.
Columbus, Sandusky & Hocking.	Spokane Falls & Northern.
Cornwall & Lebanon.	St. Louis, Chicago & St. Paul.
Delaware, Lackawanna & Western.	St. Louis, Iron Mountain & Southern.
Denver & Rio Grande.	St. Louis, Kansas City & Colorado.
Detroit, Grand Rapids & Western.	St. Louis, Keokuk & North-Western.
Detroit, Toledo & Milwaukee.	St. Louis South-Western.
Detroit & Lima Northern.	St. Louis South-Western of Texas.
Fitchburg.	St. Louis & Hannibal.
Florida Central & Peninsular.	Texas & Pacific.
Fort Worth & Denver City.	Toledo & Ohio Central.
Grand Rapids & Indiana.	Toledo & Ohio Central Extension.
Grand Trunk R'y System.	Toledo, Columbus & Cincinnati.
Hannibal & St. Joseph.	Tyler South-Eastern.
Jacksonville, Tampa & Key West.	Union Pacific.
Jacksonville, St. Augustine & Indian River.	Union Pacific, Denver & Gulf.
Kanawha & Michigan.	United Counties.
Kansas City, St. Joseph & Council Bluffs.	Wabash.
Lake Shore & Michigan Southern.	West Virginia Central & Pittsburgh.
	Wheeling & Lake Erie.

MINUTES OF MEETINGS OF EXECUTIVE COMMITTEE.

MINUTES OF MEETING OF THE EXECUTIVE COMMITTEE OF THE MASTER CAR BUILDERS' ASSOCIATION, HELD AT SARATOGA, NEW YORK, JUNE 14, 1898.

Members present: Messrs. Crone, Bronner, Schroyer, Chamberlain, Demarest, Rhodes, Leeds, Martin, Higgins and Mendenhall.

The minutes of previous meeting were read and approved.

The reports of the Secretary and Treasurer were read and ordered read in convention.

The matter of dues was then considered, and it was decided to recommend to the Association that the dues per vote be fixed at \$4 for the coming year.

The Treasurer was instructed to arrange to receive some rate of interest on at least \$6,000 of the surplus in his hands, if possible, by making time deposits in the First National Bank of Baltimore, or otherwise to get interest in the Hamilton County Bank on this portion of the surplus.

Correspondence with Secretary Allen of the American Railway Association was read and considered, and referred to the Committee on Subjects; also a letter from Mr. G. P. Conard, of the Railway Equipment Register, was read and referred to the next Executive Committee.

The candidacies for Associate membership were ordered referred to the convention as being proper shape for voting upon.

A letter from Mr. R. M. Galbraith, dated September 13, 1897, was read, and it was decided that the Executive Committee recommend to the Association that the light weights be stenciled on all freight equipment cars on account of the general adoption of the tonnage rating.

The printed reports for the convention were considered and ordered to be presented to the convention as printed.

The matter of the removal of the brake shoe testing apparatus from Pittsburg to Purdue University, Lafayette, Indiana, was considered, and the action of the Executive Committee taken by correspondence was confirmed.

It was also decided that the recommendation of the Chairman of the Standing Committee on Triple Valve Tests, that the apparatus be transferred to Purdue University, under proper arrangements, should be confirmed.

The Executive Committee then adjourned to visit the hall where the convention is to be held.

JNO. W. CLOUD,
Secretary.

MINUTES OF MEETING OF THE EXECUTIVE COMMITTEE OF THE MASTER CAR BUILDERS' ASSOCIATION, HELD AT SARATOGA, NEW YORK, JUNE 17, 1898.

After the adjournment of the convention, the Executive Committee met. Members present: Messrs. Schroyer, Bronner, Chamberlain, Hennessey, Robertson, Demarest, Mendenhall, McConnell, Appe, Morris and Higgins.

John W. Cloud was elected Secretary, under the same conditions as heretofore.

The minutes of the previous meeting were read and approved.

The matter of loading long lumber, referred to the Executive Committee by the convention, was considered, and a committee was arranged, consisting of Messrs. P. Leeds, S. P. Bush and F. H. Stark, with instructions to meet as soon as possible and seek a meeting with the committee of the American Railway Association and get the matter in readiness for the letter ballot, if it could be done, the President of the Association to decide whether the matter is suitable for submission to letter ballot, or not.

The Arbitration Committee of last year was reappointed, with instructions to select its own chairman, as follows: Messrs. G. W. Rhodes, G. L. Potter, M. M. Martin, John Mackenzie and J. N. Barr.

The matter of the action of the Association on the report of the Committee on Freight Car Springs was considered, and it was decided, upon the representation of the majority, to receive this report and its recommendations, and that the matter should be submitted to letter ballot as Recommended Practice.

The Secretary inquired how he should get the correct weights of couplers to publish to the members, as recommended by the Committee on Prices, and the Executive Committee decided that the weights of couplers were to be obtained from the manufacturers and published in accordance with their replies.

The matter of stenciling the light weight of cars was then considered, and the Secretary was instructed to send out a circular to all members of the Association and to car owners, as far as possible, stating the importance of having the light weight stenciled on their cars. The same circular or a similar circular is also to be issued to cover the fourth recommendation of the Committee on Conference with Auditors.

The matter of the height of couplers was considered, and the following committee was appointed to confer with the American Railway Association and the Interstate Commerce Commission, if necessary, in regard thereto: Messrs. Higgins, McConnell and Mendenhall. The committee was instructed to get the limits of heights of couplers changed, if possible, to 31 inches minimum and 35 inches as the maximum.

The matter of subjects for 1899 convention was then taken up and considered, and the following list of seven subjects was practically decided upon, without naming the personnel of the committees:

1. Trains Parting.
2. Square Bolt Heads and Nuts. Mr. Haskell, chairman, in place of Mr. Schroyer.

3. Should any additional compensation be paid for car repairs done west of the 105th meridian?

4. M. C. B. Couplers. To define contour lines more fully, when new and when worn, and propose specifications for couplers.

5. Air-Brake Appliances. To propose complete standards, including piping, with a view to reducing the joints to a minimum.

6. Ladders and Running Boards.

7. Wheels and Axles. Specifications for wheels and axles for 60,000, 80,000 and 100,000 pound cars.

It was moved and seconded to read By-Law No. 11 before the next convention, and say that it will be enforced in regard to the frequency of speaking.

The Secretary was instructed to advise the Standing Committee on Triple-Valve Tests, that under the action of the convention it was to test the Westinghouse and New York brakes as at present sold if there was any reason to suppose that they were different in either case from those last tested and reported on, and to report to the Executive Committee, stating whether they filled the requirements of the Recommended Practice of the Association or not; and that further tests of other valves to be offered in the future be made at the expense of the manufacturer.

The committee then adjourned.

JNO. W. CLOUD,
Secretary.

CIRCULAR RELATING TO LETTER BALLOTS.

To the Members of the Master Car Builders' Association :

During the convention of June, 1898, held at Saratoga, New York, the following matters were approved by vote and ordered referred to letter ballot as indicated:

REVISION OF STANDARDS AND RECOMMENDED PRACTICE.

The Standing Committee on the Revision of Standards and Recommended Practice of the Association made seventeen suggestions looking toward the greater perfecting of existing Standards and Recommended Practice without any very material changes therein, but including, in Suggestion No. 10, the transfer from Recommended Practice to Standards of the Association, the Axle and Journal Box with details, for cars of 80,000 pounds capacity, as these belong more properly among the Standards, and when they were adopted as Recommended Practice it was intended to be but temporary.

These seventeen suggestions are as follows :

1. Addition to note on Sheets 1 and 2, and on Sheets 4 and 5 to read, "Section of box may be made either circular or square below the center line, provided all the essential dimensions are adhered to."
2. Additional note on Sheets 2 and 5, reading: "When journal box is made of malleable iron, reduction in thickness of metal and coring to lighten weight is permissible, provided all the essential dimensions which affect interchangeability and the proper fitting of contained parts, are adhered to."
3. Reduction of clearance allowed on either side between central lug of brake shoe and adjacent lug to brake head from $\frac{1}{8}$ inch to $\frac{1}{16}$ inch. (See Sheet M. C. B. 8, corrected.)
4. On Sheet 9, diameter of release valve rod to be changed from $\frac{1}{4}$ inch to $\frac{3}{8}$ inch.
5. On Sheet 9, the diameter of truck lever connection for outside hung brakes to be changed from $\frac{3}{4}$ inch to $\frac{7}{8}$ inch, and note under title on sheet, and reading of text on page 387 to be changed accordingly.
6. On Sheet 9, diameter of hole for cotter in air-brake pin to be indicated as $\frac{1}{16}$ inch.

7. On Sheet 9, addition to note under drawing of truck lever connection for inside hung brakes, as follows. "And if made of round iron or steel must not be less than $1\frac{3}{8}$ inches diameter."

8. On Sheet 9, omit dummy coupling from drawing and show air hose hanging down.

9. On Sheet 9, omit the words "33 inches or" from dimensions shown for height of air-brake pipe above rail.

10. Adoption of axle, journal box and details for cars of 80,000 pounds capacity as an M. C. B. Standard, instead of Recommended Practice. (See Sheets M. C. B. 7, 13, 14 and 15.)

11. Modification of form of air-brake card, as illustrated, to be attached as near to the car number as possible.

12. Elimination of reference to buffer blocks on page 403.

13. Change in dimensions for radius and diameter of bearing bore gauge, Sheet C, to correspond with dimensions shown in Standard Journal Bearings for $3\frac{1}{4}$ by 7 inch and $4\frac{1}{4}$ by 8 inch journals.

14. Elimination of dummy coupling hook from the Recommended Practice.

15. In instructions for stenciling cars substitution for words "Fox Trucks" of the words "Pedestal type of trucks."

16. Addition to last paragraph on stenciling cars of the following: "Initials of the road should also appear in letters not less than 2 inches high, on one side of bolster or transom of each truck."

17. Include revised Air Brake and Signal Instructions among Recommended Practice.

THE L. S. & M. S. RAILWAY CO.
AIR-BRAKE CUT-OUT CARD.

Applied to Car No. Initials

Date at

By Inspector.

By Cond'r. Train No.

Defects

USE FIGURES TO DESIGNATE DEFECTS.

The Lake Shore & Michigan Southern Railway Co.

AIR-BRAKE CUT-OUT.

CAR CAN BE PLACED BETWEEN AIR-BRAKE CARS.

Card Applied at	Car No.	Initials	Date	Train No.
DEFECTS.	1 TRIPLE VALVE.	4 CYLINDER PACKING.	11 BRAKE RIGGING.	
2 RESERVOIR.	5 RELEASE COCK.	12 ODD BRAKE.		
3 CYLINDER.	6 CROSS-OVER PIPE.	13		

By Inspector. | By Conductor.

DIVISION.

THE L. S. & M. S. RAILWAY CO.
DEFECTIVE AIR-BRAKE CARD.

Applied to Car No. Initials

Date at

By Inspector.

By Cond'r. Train No.

Defects

USE FIGURES TO DESIGNATE DEFECTS.

The Lake Shore & Michigan Southern Railway Co.

DEFECTIVE AIR BRAKE.

CAR CANNOT BE PLACED BETWEEN AIR-BRAKE CARS.

Card Applied at	Car No.	Initials	Date	Train No.
DEFECTS.	1 TRIPLE VALVE.	6 RELEASE COCK.	11 BRAKE RIGGING.	
2 RESERVOIR.	7 ANGLE COCK.	8 CROSS-OVER PIPE.	12 ODD BRAKE.	
3 CYLINDER.	9 TRAIN PIPE.	10 HOSE CONNECTION.	13	
4 CYLINDER PACKING.				
5 CUT-OUT COCK.				

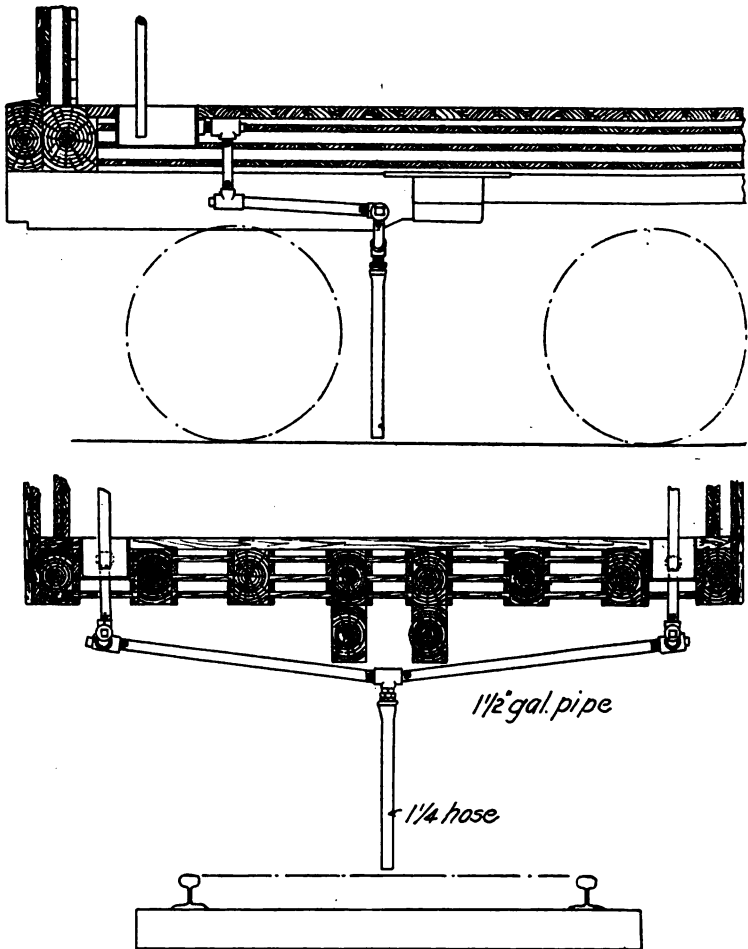
By Inspector. | By Conductor.

DIVISION.

FOR ADOPTION AS RECOMMENDED PRACTICE.

18. SALT WATER COLLECTION.

The Committee on Rust from Salt Water Drippings from Refrigerator Cars proposed a construction to collect such drippings and discharge between the rails, as shown in cut marked "No. 1. Device for disposing of salt water drippings." It was ordered referred to letter ballot for adoption as a Recommended Practice of the Association.



No. 1.—Device for Disposing of Salt Water Drippings.

19. PASSENGER CAR PEDESTAL AND JOURNAL BOX FOR 4¼ BY 8 INCH JOURNALS.

The committee which reported on this subject proposed a Pedestal and a Journal Box for 4¼ by 8 inch Journals, which, with some slight corrections, are shown in Sheets M. C. B. G and M. C. B. H. These were ordered by the convention to be referred to letter ballot for adoption as a Recommended Practice of the Association.

20. AIR BRAKE AND SIGNAL INSTRUCTIONS.

The committee which acted jointly with a committee of the American Railway Master Mechanics' Association brought in a joint report, agreed to by both committees, for the revision of the Air Brake and Signal Instructions adopted by both Associations in 1892. (For code in detail as revised, see Appendix A.) This revised code was ordered submitted to letter ballot for adoption as a Recommended Practice of the Association.

21. SPRINGS FOR FREIGHT CAR TRUCKS.

The committee on this subject submitted designs for coils and for caps suitable for certain groupings of springs, as follows :

Spring A.—5 inches diameter, $\frac{5}{8}$ inch diameter steel, 5¾ inches free height ; to carry 3,500 lbs. at 5 inches ; weight, 10¼ pounds.

Spring B.—3½ inches diameter, $\frac{5}{8}$ inch diameter steel, 5¾ inches free height ; to carry 1,150 pounds at 5 inches ; weight, 4 pounds.

Spring C.—7 inches diameter, 1½ inch diameter steel, 7 inches free height ; to carry 8,000 pounds at 6 inches ; weight, 24½ pounds.

Spring D.—4¼ inches diameter, ¾ inch diameter steel, 7 inches free height ; to carry 4,500 pounds at 6 inches ; weight, 9½ pounds.

Spring E.—7½ inches diameter, 1¾ inch diameter steel, 7½ inches free height ; to carry 11,000 pounds at 6½ inches ; weight, 32 pounds.

Spring F.—4½ inches diameter, ¾ inch diameter steel, 7½ inches free height ; to carry 5,000 pounds at 6½ inches ; weight, 12½ pounds.

By reference to the column headed "Arch Bar Trucks," in the schedule submitted, it will be seen that the carrying capacities of the groups recommended increase by fairly regular gradations. To enable the recommended coils to be most generally and economically useful, such groups can be selected and used as come nearest in capacity to the actual load to be carried, without reference to the marked carrying capacity of the car. Thus a heavy refrigerator car of 50,000 pounds capacity and a flat car of 70,000 pounds capacity may use the same combination of springs, on account of the great difference in light weight of the bodies.

If this plan is followed, the committee would recommend that the number and class letter of the coils to be used in each truck should be stenciled on the truck to prevent mistakes being made by repairmen.

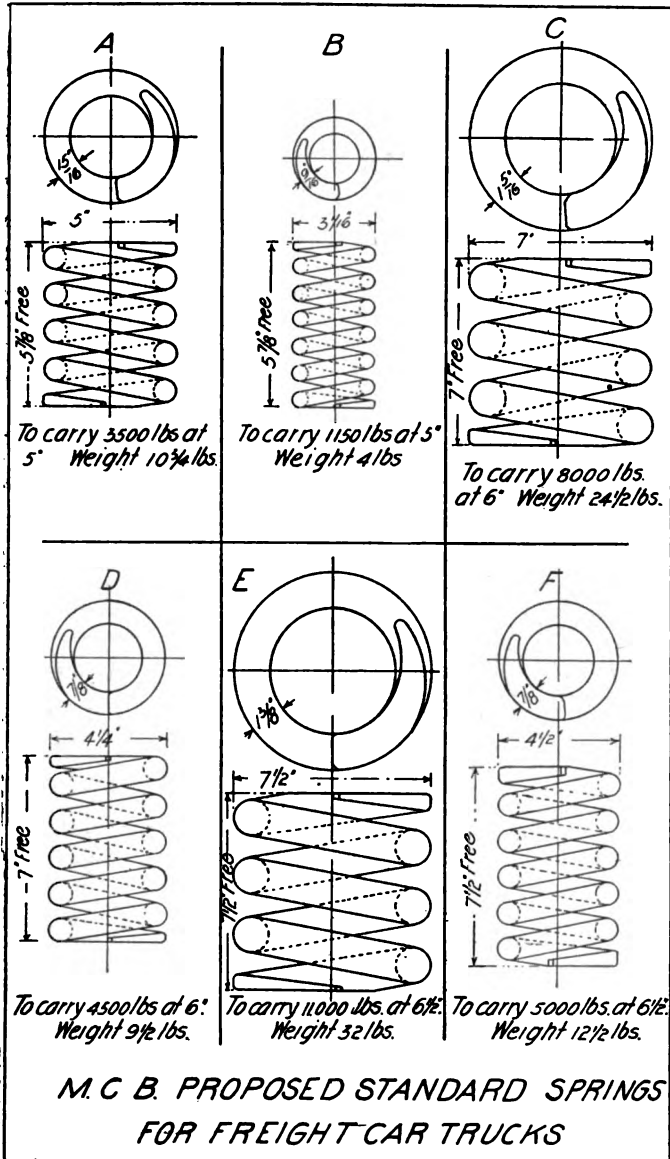
To meet the greatest possible variety of conditions, drawings for spring caps are submitted, showing caps for springs C and D or E and F, to be used in groups of four, or in groups of two, the smaller coils being placed inside the larger ones. Your committee recommends that the springs and caps submitted, and the schedule for their use, be referred to letter ballot for adoption as Recommended Practice.

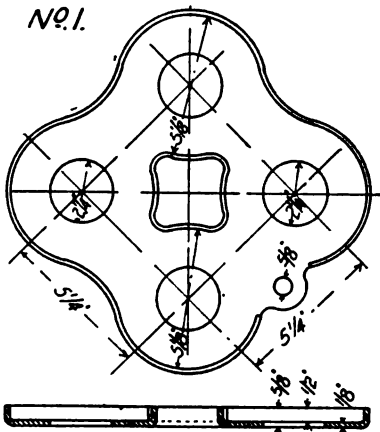
SCHEDULE FOR THE USE OF RECOMMENDED SPRINGS.

Capacity of Car.	Arch-Bar Trucks — Per Group.					Pedestal Trucks — Per Box.			
	No. of Coils.	Capacity, Lbs.	At.	Weight, Lbs.	Cap.	No. of Coils.	Capacity, Lbs.	At.	Weight, Lbs.
			Inches					Inches	
40,000 Lbs.	4 of A	14,000	5¼	43	No. 1	.....	.....	.....	....
50,000 Lbs.	4 of A	16,300	5¼	51	No. 1	1 of C	8,000	6	24½
	2 of B								
	5 of A	17,500	5¼	53¾	No. 2	.....	.....	.....	....
60,000 Lbs.	4 of A	18,600	5¼	59	No. 1	1 of C	12,500	6	34
	4 of B					1 of D			
	6 of A	21,000	5¼	64½	No. 3	.....	.....	.....	....
70,000 Lbs.	2 of C	25,000	6¼	68	No. 4 or No. 5	1 of E 1 of F	16,000	6½	44½
80,000 Lbs.	2 of D								
	2 of E	32,000	6¼	89	No. 6 or No. 7	1 of E 1 of F	17,000	6¼	44½
	2 of F								

NOTE.—Heights given in above include spring caps for arch-bar trucks.

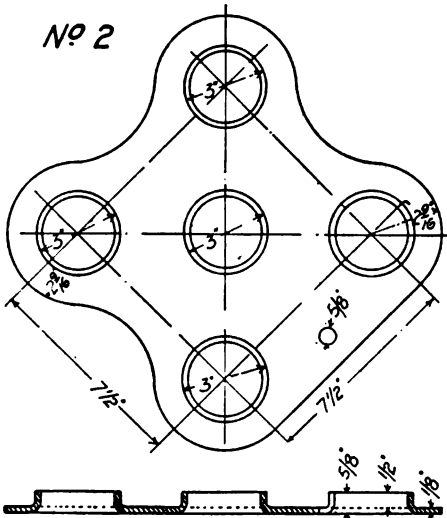
Number and class letter of springs used to be stenciled on the trucks of cars.



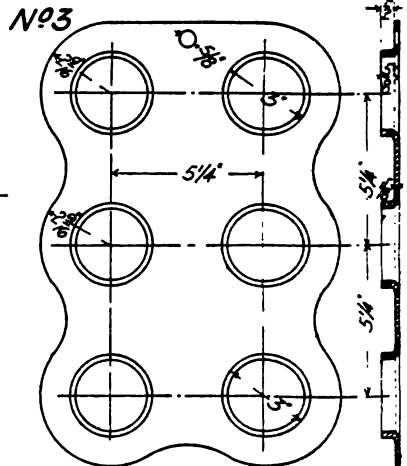


M.C.B
PROPOSED STANDARD
SPRING CAPS
FOR
FREIGHT CAR TRUCKS.

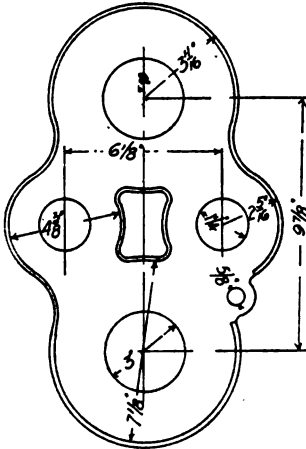
Used on arch bar trucks for Cars of 40000, 50000 or 60000 lbs. capacity; with groups of four coils. With or without inner coils as required by capacity of car and as indicative in schedule.



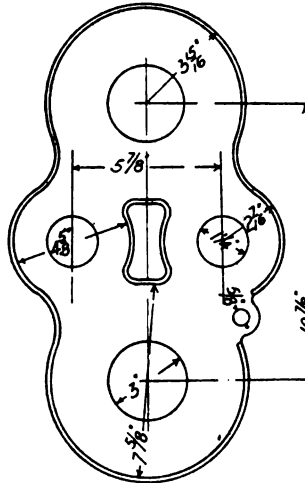
Used on arch bar trucks for cars of 50000 lbs. capacity with groups of five coils.



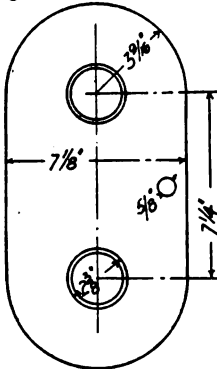
Used on arch bar trucks for Cars of 60000 lbs. capacity with groups of six coils.

N^o 4

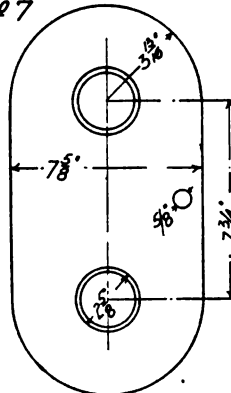
Used on arch bar trucks for Cars of 70000 lbs. capacity, with groups of four coils.

N^o 6

Used on arch bar trucks for cars of 80000 lbs. capacity with groups of four coils.

N^o 5

Same as N^o 4 but with groups of two coils with inner coils.

N^o 7

Same as N^o 6 but with groups of two coils with inner coils.

After adoption by vote of the convention, the recommendations of the committee were ordered referred to letter ballot for adoption as Recommended Practice of the Association.

22. LOADING LONG MATERIALS, ETC.

The Rules for Loading Long Materials were considered, and some changes therein were proposed, including the addition thereto of rules for loading Pipe and Stone. After discussion, the matter was ordered referred to a committee to consider at once and to confer with a committee of the American Railway Association in time to be included in this ballot. That committee has reported with some further slight changes, all of which (excepting the added rules for loading Pipe and Stone) are printed in italics in the proposed revised Rules shown in Appendix B, which are submitted for adoption as a Recommended Practice of the Association.

These twenty-two questions are hereby submitted to letter ballot as ordered, and each member is requested to vote by writing "yes" or "no" opposite each numbered question on enclosed voting slip and remailing it to the Secretary at the address below. The votes will be counted August 29, 1898, and any votes received at the Secretary's office after that date will be excluded from the count, as provided by the Constitution.

No qualified votes can be counted. The number of votes should agree with bills for 1898, or the Secretary should be advised of any needful corrections.

JNO. W. CLOUD,
Secretary.

974 Rookery Building,
CHICAGO, ILL., July 28, 1898.

For Appendix A see "Air Brake and Signal Instructions, Revised 1898."

For Appendix B see "Rules Governing the Loading of Lumber and Timber on Open Cars, Revised 1898."

LETTER BALLOT VOTING SHEET.

Ballots are to be cast by writing "Yes" or "No" opposite the number of the question to be voted on on this sheet (the numbers corresponding with the questions so numbered on accompanying circular relating to Letter Ballot) and mailing it to the Secretary at 974 Rookery Building, Chicago, Ill.

The ballots will be counted August 29, 1898, and all ballots received after that date will be excluded.

No qualified votes can be counted.

1.....	9.....,	16.....
2.....	10.....	17.....
3.....	11.....	18.....
4.....	12.....	19.....
5.....	13.....	20.....
6.....	14.....	21.....
7.....	15.....	22.....
8.....		

Sign name here.....

Number of votes.....

N. B.—The number of votes should agree with bills for 1898 or the Secretary should be advised of any needful corrections.

RESULT OF LETTER BALLOT.

The Letter Ballot which closed August 29, 1898, resulted as follows:

SUMMARY OF VOTES AND RESULTS.

Questions.	Affirmative.	Negative.	Total.	Votes Necessary.	Result.
1	903	50	953	635	Adopted.
2	956	0	956	638	"
3	783	167	950	634	"
4	896	60	956	638	"
5	951	3	954	636	"
6	956	0	956	638	"
7	861	81	942	628	"
8	815	126	941	628	"
9	831	79	910	607	"
10	809	130	939	626	"
11	775	135	910	607	"
12	697	187	884	589	"
13	934	18	952	635	"
14	812	144	956	638	"
15	858	96	954	636	"
16	920	36	956	638	"
17	955	1	956	638	"
18	703	96	799	533	"
19	709	89	798	532	"
20	847	0	847	565	"
21	667	133	800	533	"
22	809	37	846	564	"

CHICAGO, August 30, 1898.

JNO. W. CLOUD,
Secretary.

STANDARDS AND RECOMMENDED PRACTICE

OF THE

MASTER CAR BUILDERS' ASSOCIATION.

GENERAL.

By a letter ballot cast in 1893, the standards of the Association prevailing at that date were modified —

First.—By abolishing certain standards because they had either become obsolete or nearly so, or because they were simply forms of gauges for shop use to produce certain other standard forms, and it was believed that such gauges were not essential as standards of the Association, and it had been ascertained that they were not generally used.

The old standards thus abolished were :

Wheel diameter testing gauge.

Wheel flange and journal gauge.

Wheel bore testing gauge.

Wheel boring, use of six dogs.

Journal length and diameter gauge.

Journal shoulder and centering gauge.

Journal distance gauge.

Guard-rail gauge. (Made standard again in 1894.)

Attachments and dimensions of drawbars.

Train-pipe fitting for steam heat.

Second.—By ordering that the three items formerly printed at the end of the standards, namely :

Storage of line cars on foreign roads,

Dictionary of terms,

Entertainments,

be printed with the Proceedings as heretofore, but not among the standards.

Third.—By dividing the remaining standards into :

(a) Standards of the Association.

(b) Recommended Practice.

These Standards and this Recommended Practice are given under their respective heads in the following pages as modified by letter ballot on these or other subjects, and revised by the ballot of 1894 and subsequent years to date.

New drawings of the Standards and Recommended Practice were ordered made on sheets of uniform size, to be lithographed and printed on transparent paper so that blue prints might be taken from them ; such sheets to be held for

sale by the Secretary in connection with pamphlets containing explanatory text as given in the Proceedings. Reduced copies of these sheets to be bound with the Proceedings in connection with the text of the Standards and Recommended Practice.

STANDARDS OF THE ASSOCIATION.

JOURNAL BOX AND DETAILS.

For Journals, $3\frac{1}{4}$ by 7 inches. Sheets M. C. B. 1, 2, 3.

The journal box and details as shown in these drawings were adopted as standards of the Association, by letter ballot, in 1893, and revised in 1894 and 1896. For former action, see Proceedings 1874, page 40; Proceedings 1881, pages 14, 15 and 27.

The revision made in 1894 consisted in correcting the drawing at the top of the journal box, and in leaving off the lugs at sides of arch bars. Also in changing the wedge and bearing so as to make the latter flat on top instead of curved, as theretofore, and in curving the top of the wedge, thus making this construction similar in general arrangement to the standard forms for the $4\frac{1}{4}$ by 8 inch journal box.

The revision made in 1896 consisted in the elimination of the dust guard from Sheet 1, and the addition of notes providing that any suitable dust guard might be used, and that a rivet or nut might be used instead of the cotter, if preferred, in the hinge pin of the lid. Also in the addition to Sheet 3 of a similar note to the latter, and of notes concerning the lid spring and the wedge. At the same time the side lugs on the brass were increased so as to measure $1\frac{1}{2}$ inches long instead of 1 inch long as they were formerly.

One additional note was made on Sheet M. C. B. 1 and two additional notes on Sheet M. C. B. 2 in 1898.

JOURNAL BOX AND DETAILS.

For Journals, $4\frac{1}{4}$ by 8 inches. Sheets M. C. B. 4, 5, 6.

The journal box and details as shown in these drawings were adopted as standards of the Association, by letter ballot, in 1893, and revised in 1896. For former action see Proceedings 1891, pages 142-144.

The revision made in 1896 consisted in the elimination of the dust guard from Sheet 4; also, in removing the arch bar seat lugs from Sheets 4 and 5, and making the arch bar seat $4\frac{1}{2}$ inches wide. Also, in the addition to Sheet 4 of notes providing that any suitable dust guard might be used, and that a rivet or nut might be used instead of a cotter, if preferred, in the hinge pin of the lid. Also, in the addition to Sheet 6 of a similar note to the latter, and of notes concerning the lid spring and the wedge. At the same time the side lugs on the brass were increased so as to measure $1\frac{1}{2}$ inches long instead of $\frac{3}{4}$ inch long as they were formerly.

One additional note was made on Sheet M. C. B. 4 and two additional notes on Sheet M. C. B. 5 in 1898.

JOURNAL BOX AND DETAILS.

For Journals, 5 by 9 inches. Sheets M. C. B. 13, 14 and 15.

The journal box and details shown in these drawings were adopted as recommended practice in 1896. In 1898 they were adopted as standards of the Association.

AXLE.

With Journals, $3\frac{3}{4}$ by 7 inches. Sheet M. C. B. 7.

This axle is the standard of the Association for cars of 40,000 pounds capacity.

In 1873 a standard for car axle was recommended, the form and dimensions of which, excepting the diameter in the middle, were substantially the same as shown in this sheet. In 1884 the diameter at the middle was increased from $3\frac{3}{8}$ inches to $4\frac{1}{4}$ inches, by letter ballot.

For action of the Association see Proceedings 1876, page 99; Proceedings 1878, page 129; Proceedings 1879, page 103; Proceedings 1880, page 130; Proceedings 1884, pages 156-162.

AXLE.

With Journals, $4\frac{1}{4}$ by 8 inches. Sheet M. C. B. 7.

This axle was adopted as a standard of the Association for cars of 60,000 pounds capacity, by letter ballot, in 1889; see Proceedings 1889, pages 88-109.

AXLE.

With Journals, 5 by 9 inches. Sheet M. C. B. 7.

This axle was adopted as recommended practice in 1896, and was made a standard of the Association in 1898.

FORM OF WHEEL TREAD AND FLANGE.

Sheet M. C. B. 7.

This form of wheel tread and flange was adopted as a standard of the Association, by letter ballot, in 1886. For action of the Association see Proceedings 1882, pages 178 and 179; Proceedings 1886, page 68.

Drawing M. C. B. Sheet 7 was revised in 1896 by the omission of standard wheel gauge. See Sheet M. C. B. 12.

For flange thickness limits see Sheet M. C. B. 12.

WHEEL CIRCUMFERENCE MEASURE.

Sheet M. C. B. 7.

By letter ballot in 1893, the Wheel Circumference Measure shown on Sheet 7 was adopted as a standard of the Association. Prior to that date it had been recommended for use in all car building shops. See Proceedings 1892, page 172.

BRAKE HEAD AND SHOE.

Sheet M. C. B. 8.

The brake head and shoe shown on this sheet, known as the Christie brake head and shoe, were adopted as a standard of the Association, by letter ballot in 1886, with the exception of some slight modification in details made since that date. Drawing revised in 1896 and in 1898.

The revision made in 1896 consisted in the modification of the designs of brake head and shoe so as to secure increased clearance at the ends of shoe and equal clearance both above and below the central lug on the back of the shoe; also, the addition of brackets to support the lower bridge lug of brake head similar to the brackets formerly used to support the upper bridge lug. The taper of the shoe was altered so that it would correspond with the taper of the standard wheel tread, by increasing the thickness of the inner edge of the shoe from $1\frac{3}{16}$ inches to $1\frac{1}{8}$ inches.

The revision made in 1898 consisted in reducing the clearance allowed on either side (above and below) the central lug of brake shoe and adjacent lugs of brake head from $\frac{1}{8}$ inch to $\frac{1}{16}$ inch — the change being made wholly in the head and no change in the shoe.

For action of the Association, see Proceedings 1886, page 72; Proceedings 1888, pages 140, 160, 161; Proceedings 1891, pages 212 and 240.

BRAKE BEAM.

Sheet M. C. B. 8.

Certain dimensions and capacities of brake beam were adopted as standard of the Association, by letter ballot, in 1889, and these standards, as modified by subsequent action, are shown on this drawing for iron brake beams.

All beams must be capable of withstanding a load of 7,500 pounds at center without more than 1-16 inch deflection; where it is necessary to use a stronger beam, it must be capable of standing a load of 15,000 pounds at center without more than 1-16 inch deflection.

The angle of brake beam lever is 40 degrees from vertical.

For action of the Association, see Proceedings 1890 and 1893.

Standard heights of brake beams, when measured from the tops of the rails to the center of the face of new shoes, were adopted in 1894, as follows:

For inside hung beams, 13 inches.

For outside hung beams, $14\frac{1}{2}$ inches.

AIR BRAKES — GENERAL ARRANGEMENT AND DETAILS.

Sheet M. C. B. 9.

The general arrangement and details of brake gear for air-brake cars, as shown on this sheet, are standard. See letter ballot 1889, and other action 1890, 1891 and 1898. At the same time the following standards were adopted in this connection:

1. Maximum train-pipe pressure, 70 pounds per square inch.

2. Maximum brake power in freight cars, 70 per cent of the light weight of car.

3. All levers 1 inch in thickness; all pins to be $1\frac{1}{4}$ inches in diameter; all jaws or clevises made of $\frac{3}{4}$ -inch by $2\frac{1}{2}$ -inch iron; all rods $\frac{3}{4}$ inch diameter.

4. Angle of brake beam lever, 40 degrees with vertical.

Drawing revised in 1896 and 1898.

The revision made in 1896 consisted in the omission of such detail dimensions as could not be used in all cases, such as the length and proportions of main levers, and the omission of some of the smaller parts from the drawing, such as the pipe clamps, staples, etc. The dimensions of the cross-section of the malleable iron truck lever connection were increased, and the letters W. I., M. I., C. I., etc., indicating the material of which the parts were to be made, were omitted from the drawing.

In 1898 the following changes were made in Sheet M. C. B. 9:

Diameter of truck lever connection for outside hung brakes changed from $\frac{3}{4}$ inch to $\frac{7}{8}$ inch, and a note to this effect was added under title on this sheet.

Diameter of hole for cotter in air-brake pin was first indicated as $1\frac{1}{8}$ inch.

Addition was made to note under drawing of truck lever connection for inside hung brakes as follows: "If made of round iron or steel, must not be less than $1\frac{1}{8}$ inches diameter."

Dummy coupling was omitted from drawing and air hose was shown as hanging down.

The words "33 inches or" were omitted from height shown for air-brake pipe above rail.

Diameter of release-valve rod was changed from $\frac{1}{4}$ inch to $\frac{3}{8}$ inch.

PEDESTAL.

Sheet M. C. B. 10.

The pedestal shown on this sheet was recommended in 1874. See Proceedings 1874, page 40; again approved as standard in 1881; see Proceedings 1881, pages 14, 15 and 27. Also approved by the Master Mechanics' Association in the same year. Again adopted as standard in 1893. Weight, 141 pounds.

AUTOMATIC COUPLER.

Sheet M. C. B. 11.

Form adopted as standard in 1887, see pages 199-208, 243 and 253. Further details adopted in 1889 and 1893. Action of the Association in 1889 permits the use of a coupler 28 inches long instead of 30 inches as shown, for use only on cars already in service and requiring such length drawbar. In 1889 the Association decided that the opening in carrier iron, where drawhead enters, should be $5\frac{1}{4}$ inches vertically and $5\frac{1}{2}$ inches horizontally.

Drawing revised in 1896.

The revision made in 1896 consisted in the elimination of the carrier iron from Sheet B of the Recommended Practice.

CONTOUR LINE AND LIMIT GAUGES, FOR AUTOMATIC COUPLER.

Sheet M. C. B. 11.

Standard contour line was announced by Executive Committee under instructions from the Association April 8, 1888. Limit gauges for preserving standard contour line adopted in 1891.

These gauges, properly proven by master gauges, may be procured from Pratt & Whitney Company, of Hartford, Connecticut. A duplicate set of master gauges is held in the office of the Secretary for reference when desired.

YOKE OR POCKET STRAP FOR M. C. B. COUPLERS.

Sheet M. C. B. 11.

In 1897 the yoke or pocket strap for attaching M. C. B. couplers to cars, which had been shown on Sheet M. C. B.—B. as recommended practice, was adopted as standard of the Association, with the addition of a radius of $\frac{1}{4}$ inch at the back end of the strap. See Sheet M. C. B. 11. Proceedings 1897, pages 77 to 87.

BUFFER BLOCKS AND LOCATION.

Sheet M. C. B. 11.

In 1897 the buffer block and location, theretofore shown on Sheet M. C. B.—B. as recommended practice, but with some additional details of the buffer block, were adopted as standard of the Association. See Sheet M. C. B. 11. Proceedings 1897, page 185.

TERMS AND GAUGING POINTS FOR WHEELS AND TRACK.

Sheet M. C. B. 12.

Standard terms and gauging points for wheels and track were adopted in 1894 as follows. See Sheet M. C. B. 12:

- 1.—TRACK RAILS are the two main rails forming the track.
- 2.—GAUGE OF TRACK is the shortest distance between the heads of track rails.
- 3.—BASE LINE, for wheel gauges, is a line parallel to the axis of the wheels drawn through the point of intersection of tread with a line perpendicular to the axis, and passing through the center of the throat curve.
- 4.—INSIDE GAUGE OF FLANGES is the distance between backs of flanges of a pair of mounted wheels measured on a line parallel to the base line, but $\frac{1}{4}$ inch nearer to the axis of the wheels.
- 5.—GAUGE OF WHEELS is the distance between the outside faces of flanges of a pair of mounted wheels measured on a line parallel to the base line, but $\frac{1}{4}$ inches farther from the axis of the wheels.
- 6.—THICKNESS OF FLANGE is the distance measured parallel to the base line between two lines perpendicular thereto, one drawn through the point of measurement of "inside gauge of flanges," and the other drawn through the point of measurement of "gauge of wheels."

7.—**WIDTH OF TREAD** is the distance measured parallel to the base line from a line perpendicular thereto, drawn through the point of measurement of "gauge of wheels" to the outer edge of tread.

8.—**CHECK GAUGE DISTANCE** is the distance measured parallel to the base line between two lines perpendicular thereto, one drawn through the point of measurement of "inside gauge of flanges" on either wheel, and the other drawn through point of measurement of "gauge of wheels" on mate wheel.

9.—**OVER ALL GAUGE** is the distance parallel to base line from outer edge of one wheel to the outer edge of mate wheel.

The above mentioned wheel gauge distances are either directly or by inference as follows:

Inside Gauge of Flanges.....	4 feet 5½ inches.
Gauge of Wheels	" 8½ "
Thickness of Flange.....	1¾ "
Width of Tread.....	4¾ "
Check Gauge Distance	4 " 6¾ "
Over All Gauge	5 " 4¾ "

GUARD-RAIL AND FROG WING GAUGE.

Sheet M. C. B. 12.

The guard-rail and frog wing gauge shown in Sheet M. C. B. 12 were adopted as standard in 1894, to define the dimensions of track to which M. C. B. standard wheel and flange gauges have been made to conform.

DISTANCE BETWEEN THE BACKS OF THE FLANGES OF CAR WHEELS.

The standard distance between the backs of flanges of car wheels is 4 feet 5¾ inches. See Proceedings 1883, pages 55, 118-120.

In 1885 it was decided by letter ballot that in fitting wheels on axles a variation of ⅛ inch each way from the standard distance of 4 feet 5¾ inches between flanges would be allowed, making the maximum distance 4 feet 5½ inches, and the minimum distance 4 feet 5¼ inches. See Proceedings 1885, pages 111-119. Drawing revised in 1896. See below.

STANDARD REFERENCE GAUGE FOR MOUNTING AND INSPECTING WHEELS, AND CHECK GAUGE.

Sheet M. C. B. 12.

In 1896 a new standard reference gauge for mounting and inspecting wheels was adopted by letter ballot to take the place of the check gauge for mounting wheels, formerly shown on Sheet M. C. B. 12, and the gauge for distance between wheels formerly shown on Sheet M. C. B. 7. At same date a standard check gauge was adopted, both as shown on Sheet M. C. B. 12. See Proceedings 1896.

WHEEL FLANGE THICKNESS GAUGES FOR NEW WHEELS.

Sheet M. C. B. 12.

Maximum and minimum wheel flange thickness gauges for new wheels were adopted as standard in 1894. They are shown in Sheet M. C. B. 12 along with the standard form of wheel tread and flange reproduced from Sheet M. C. B. 7 for easy reference. These gauges admit a variation of 1-16 inch either way from the standard thickness of $1\frac{3}{8}$ inches when measured as shown. Such gauges should be used on all new wheels after September 1, 1894, to insure ability to mount them properly to check gauge.

HEIGHT OF DRAWBARS.

The standard height of drawbars for passenger equipment cars is 35 inches from top of rail when car is light. Adopted in 1890; see Proceedings 1890 and 1893.

The standard height of drawbars for freight cars, measured perpendicular from the level of the tops of rails to center of drawbars, adopted in 1893, is $34\frac{1}{2}$ inches, with no greater variation allowable than 3 inches, minimum height $31\frac{1}{2}$ inches. By center of drawbar is meant the horizontal line through the center of the drawbar shank. See Proceedings 1872, pages 42, 43 and 46; Proceedings 1879, pages 108 and 109; Proceedings 1884, page 30; Proceedings 1896.

M. C. B. REPORTS.

In 1893 a standard size of 6 inches by 9 inches was adopted for M. C. B. reports. See Proceedings 1893.

PAMPHLETS, CATALOGUES, SPECIFICATIONS, ETC.

In 1894 standard sizes for publications of this nature were adopted and the size of postal card circular was changed in 1895 so that they are now as follows:

For postal card circulars, $3\frac{1}{2}$ inches by $5\frac{1}{2}$ inches.

For pamphlets and trade catalogues	{	$3\frac{1}{2}$ inches by 6 inches.
		6 inches by 9 inches.
		9 inches by 12 inches.

For specifications and letter paper, $8\frac{1}{4}$ inches by $10\frac{3}{4}$ inches.

In connection with these standards it was decided that a standard practice should be to have the proper standard dimensions, and the word "standard" printed on the upper left-hand corner of title-page or cover whenever practicable.

SCREW THREADS, BOLT HEADS AND NUTS.

The Sellers or Franklin Institute system of screw threads, bolt heads and nuts is the standard of the Association, and repeated action of the Association has deprecated the use of any other system and encouraged the careful maintenance of these standards. See Proceedings 1872, pages 18 and 21; Proceedings 1879, pages 82 and 83; Proceedings 1882, page 229.

A set of gauges for standard screw threads and a standard inch scale, 2 feet long, are held in the office of the Secretary for reference.

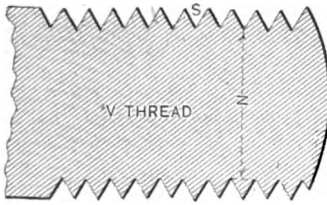


FIG. 11.



FIG. 13.

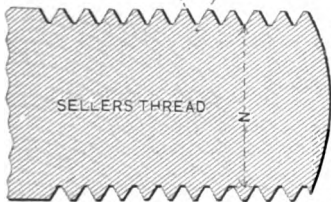


FIG. 15.

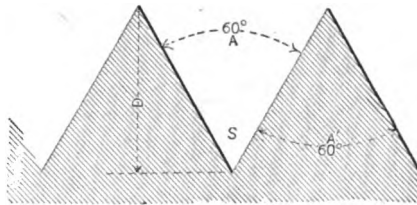


FIG. 12.

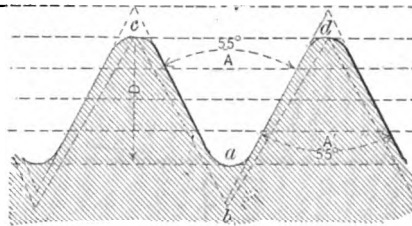


FIG. 14.

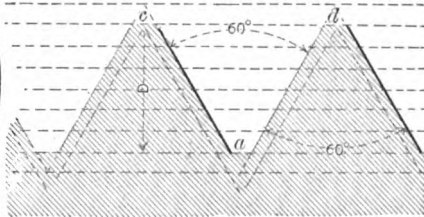


FIG. 16.













Mr. Sellers, who proposed this system of screw threads, described it in an essay read before the Franklin Institute of Philadelphia, April 21, 1864, as follows :

" The proportions for the proposed thread and its comparative relation to the sharp and rounded threads, will be readily understood from the accompanying diagram in which Figs. 11 and 12 — the latter on an exaggerated scale — represent a sharp thread, Figs. 13 and 14 a rounded top and bottom to the English proportion, and Figs. 15 and 16 the flat top and bottom, all of the same pitch. The angle of the proposed thread is fixed at 60° , the same as the sharp thread, it being more readily obtained than 55° ; and more in accordance with the general practice in this country. Divide the pitch, or, which is the same thing, the side of the thread into eight equal parts, take off one part from the top and fill in one part in the bottom of the thread, then the flat top and bottom will equal one-eighth of the pitch; the wearing surface will be three-quarters of the pitch, and the diameter of screw at bottom of the thread will be expressed by the formula :

$$\text{Diameter} = \frac{1,299}{\text{number of threads per inch.}}$$

The accompanying tables are reprinted from Mr. Sellers' essay : they give the proportions of his standard screw threads, nuts and bolt heads :

PROPORTIONS FOR SELLERS' STANDARD SCREW-THREADS, NUTS AND BOLTS.

SCREW-THREADS.				NUTS.				BOLT HEADS.			
Diameter of screw.	Threads per inch.	Diameter at root of thread.	Width of flat.	Short diameter rough.	Short diameter finish.	Thickness rough.	Thickness finish.	Short diameter rough.	Short diameter finish.	Thickness rough.	Thickness finish.
											
$\frac{1}{4}$	20	.185	.0062	$\frac{1}{4}$	$\frac{7}{16}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{7}{16}$	$\frac{1}{4}$	$\frac{1}{8}$
$\frac{5}{16}$	18	.240	.0074	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{4}$	$\frac{1}{8}$
$\frac{3}{8}$	16	.294	.0078	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{8}$
$\frac{7}{16}$	14	.344	.0089	$\frac{1}{4}$	$\frac{5}{8}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{5}{8}$	$\frac{1}{4}$	$\frac{1}{8}$
$\frac{1}{2}$	13	.400	.0096	$\frac{1}{4}$	$\frac{3}{4}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{4}$	$\frac{1}{4}$	$\frac{1}{8}$
$\frac{9}{16}$	12	.454	.0104	$\frac{1}{4}$	$\frac{7}{8}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{7}{8}$	$\frac{1}{4}$	$\frac{1}{8}$
$\frac{5}{8}$	11	.507	.0113	$\frac{1}{4}$	1	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{4}$	1	$\frac{1}{4}$	$\frac{1}{8}$
$\frac{3}{4}$	10	.620	.0125	$\frac{1}{4}$	$1\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{4}$	$1\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{8}$
$\frac{7}{8}$	9	.731	.0138	$\frac{1}{4}$	$1\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{4}$	$1\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{8}$
1	8	.887	.0156	$\frac{1}{4}$	$1\frac{1}{2}$	1	$\frac{1}{8}$	$\frac{1}{4}$	$1\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{8}$
$1\frac{1}{8}$	7	.940	.0178	$\frac{1}{4}$	$1\frac{3}{4}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{4}$	$1\frac{3}{4}$	$\frac{1}{4}$	$\frac{1}{8}$
$1\frac{1}{4}$	7	1.065	.0173	2	$1\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{8}$	2	$1\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{8}$
$1\frac{3}{8}$	6	1.160	.0208	$2\frac{1}{8}$	$2\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{8}$	$2\frac{1}{8}$	$2\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{8}$
$1\frac{1}{2}$	6	1.284	.0208	$2\frac{1}{4}$	$2\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{8}$	$2\frac{1}{4}$	$2\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{8}$
$1\frac{5}{8}$	5 $\frac{1}{2}$	1.389	.0227	$2\frac{1}{2}$	$2\frac{3}{4}$	$\frac{1}{4}$	$\frac{1}{8}$	$2\frac{1}{2}$	$2\frac{3}{4}$	$\frac{1}{4}$	$\frac{1}{8}$
$1\frac{3}{4}$	5	1.491	.0250	$2\frac{3}{4}$	$2\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{8}$	$2\frac{3}{4}$	$2\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{8}$
$1\frac{7}{8}$	5	1.616	.0250	$2\frac{1}{2}$	$2\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{8}$	$2\frac{1}{2}$	$2\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{8}$
2	4 $\frac{1}{2}$	1.712	.0277	$3\frac{1}{4}$	$3\frac{1}{4}$	2	$\frac{1}{8}$	$3\frac{1}{4}$	$3\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{8}$

PROPORTIONS FOR SELLERS' STANDARD NUTS AND BOLTS.



Rough Nut = one and one-half diameter of bolt + $\frac{1}{16}$.



Finished Nut = one and one-half diameter of bolt + $\frac{1}{16}$.



Rough Nut = diameter of bolt.



Finished Nut = diameter of bolt — $\frac{1}{16}$.



Rough Head = one and one-half diameter of bolt + $\frac{1}{16}$.



Finished Head = one and one-half diameter of bolt + $\frac{1}{16}$.



Rough Head = one-half distance between parallel sides of head.



Finished Head = diameter of bolt — $\frac{1}{16}$.

RECOMMENDED PRACTICE

Originally separated from the Standards in 1893.

CAST-IRON WHEELS.

Specifications and Guarantee.

In 1893 specifications for cast-iron wheels and a form of guarantee by manufacturers were adopted as Recommended Practice; these had formerly been standards of the Association. See Proceedings 1889 and 1893.

They are as follows :

SPECIFICATIONS FOR CAST-IRON WHEELS.

1. "The chills in which the wheels of any one wheelmaker are cast shall be of equal diameters, and the same chill must not vary at different points more than one-sixteenth of an inch in diameter."
2. "Wheels of the same nominal diameter furnished by any one wheelmaker must not vary more than one-fourth of an inch above or below the mean size measured on the circumference, and the same wheel must not vary more than one-sixteenth of an inch in diameter. The body of the wheel must be smooth and free from slag, shrinkage or blow-holes. The tread must be free from deep and irregular wrinkles, slag, chill cracks, and sweat or beads in throat, which are one-eighth of an inch or over in diameter, or which occur in clusters of more than six inches in length."
3. "The wheels broken must show clean gray iron in the plates; the depth of pure white iron must not exceed seven-eighths of an inch, or be less than three-eighths of an inch in the middle of the tread, and shall not be less than three-sixteenths of an inch in the throat. The depth of the white iron shall not vary more than one-fourth of an inch around the tread on the rail line in the same wheel."
4. "For each hundred wheels which pass inspection and are ready for shipment, one representative wheel shall be taken at random and subjected to the following test :
 "The wheel shall be placed flange downward on an anvil block weighing not less than seventeen hundred (1,700) pounds, set on rubble masonry at least two feet deep, and having three supports not more than five (5) inches wide for the wheel to rest upon. It shall be struck centrally on the hub by a weight of one hundred and forty (140) pounds falling from a height of twelve (12) feet. Should this wheel stand five (5) blows without breaking into two or more pieces, the hundred wheels shall be accepted."
 "The above tests shall apply to standard weight wheels from twenty-six to forty-two inches in diameter, used on the standard gauge roads."
 "Or, the wheel shall be placed flange downward on a cast-iron ring weighing one thousand (1,000) pounds, the outside diameter of the ring being thirty-six and one-half ($36\frac{1}{2}$) inches, the inside diameter twenty-four (24) inches.

and thickness eight (8) inches, supported on rubble masonry at least two feet feet deep. It shall be struck on the plate, close to the rim, by a weight of one hundred (100) pounds falling from a height of seven (7) feet. When subjected to this test a five hundred and fifty (550) pound wheel shall stand twenty (20) blows ; a five hundred and seventy-five (575) pound wheel, twenty-five (25) blows, and a six hundred (600) pound wheel thirty (30) blows without breaking a piece out. This test applies to 33-inch wheels. 26, 28 and 30 inch wheels must stand the twenty-five-blow test, and 36 and 42 inch wheels must stand the thirty-blow test."

5. "Should, in either case, the test wheel break in two or more pieces with less than the required number of blows, then a second wheel shall be taken from the same lot and similarly tested. If the second wheel stands the test, it shall be optional with the inspector whether he shall test a third wheel or not, if he does not so elect, or if he does and the third wheel stands the test, the hundred wheels shall be accepted."

6. "Wheels shall not vary from the specified weight more than two per cent."

7. "The flange shall not vary in the same wheel more than three-thirty-seconds of an inch from its mean thickness."

8. "All wheels shall be numbered consecutively, and shall have the number, also the day, month and year when made, plainly formed on the inside plate in casting, and no two wheels shall have the same number."

GUARANTEE FOR CAST-IRON WHEELS.

"THIS INDENTURE, made this.....day of.....18....
by and between.....party of the
first part, and.....party of the
second part, Witnesseth :

"The party of the first part hereby agrees to furnish to the party of the second part, free on board cars at
.....chilled cast-iron wheels.....inches in
diameter, for use under....."

2. "The party of the second part hereby agrees to pay to the party of the first partdollars for each wheel furnished, and to keep an accurate account of the mileage made by the wheels placed in service under cars in passenger equipment and under locomotives and tenders, and an accurate record of the number of months of service of the wheels placed in service under cars in freight equipment."

3. "The party of the second part hereby agrees, when any wheel furnished under the contract is scrapped, to furnish to the party of the first part a statement which will show :

1. The wheel number.
2. The service in which the wheel ran.
3. The amount of service in months or miles.
4. The cause of failure.

- 6. A credit to the party of the first part of**

.....	" " "	" "	33	" " "
.....	" " "	" "	30	" " "
.....	" " "	" "	36	" locomotive and tender equipment.
.....	" " "	" "	33	" " "
.....	" " "	" "	30	" " "
.....	" " "	" "	28	" " "
.....	" " month	" "	36	" freight equipment.
.....	" " "	" "	33	" " "
.....	" " "	" "	30	" " "

1. Flat by sliding.
2. Chipped Flange.
3. Broken Flange, if the breakage is not caused by seams, worn through chill or worn flange.
4. Broken or Chipped Rim, not caused by rim being hollow.
5. Breakage of any kind caused by wreck or derailment."

5. "The party of the second part hereby agrees to hold, subject to the inspection of the party of the first part, for a period of thirty days after said statement has been rendered, any wheels (with above exceptions) which have not earned for themselves a credit equal to the amount charged against them."

36-inch passenger wheels	70,000 miles.
33-inch passenger wheels	60,000 miles.
36-inch engine and tender wheels	60,000 miles.
33-inch engine and tender wheels	50,000 miles.
30-inch engine and tender wheels	45,000 miles.
28 and 26 inch engine and tender wheels	40,000 miles.
Refrigerator, through line and cattle cars	24 months.
All other freight cars	48 months."

LIMIT GAUGES FOR ROUND IRON.

Digitized by Google

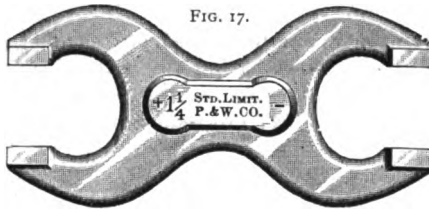


FIG. 17.



FIG. 18.

Limit gauges such as shown herewith for $1\frac{1}{4}$ -inch iron are recommended for use in procuring round iron to take the Seller's standard screw threads; round iron used to be of such size as will enter the large or + end of the gauge intended for that size, in any way, and also of such size as will not enter the small or — end in any way.

The limiting diameters for certain nominal sizes of iron, together with the maximum variation allowable by such use of these gauges, are given in the following table:

SIZES OF LIMIT GAUGES FOR ROUND IRON.

NOMINAL DIAMETER OF IRON.—INCHES.	Large Size, + end. Inches.	Small Size, — end. Inches.	Total Vari- ation Inches.
$\frac{1}{4}$ .....	.2550	.2450	.010
$\frac{5}{16}$ .....	.3180	.3070	.011
$\frac{3}{8}$ .....	.3810	.3690	.012
$\frac{7}{16}$ .....	.4440	.4310	.013
$\frac{1}{2}$ .....	.5070	.4930	.014
$\frac{9}{16}$ .....	.5700	.5550	.015
$\frac{5}{8}$ .....	.6330	.6170	.016
$\frac{3}{4}$ .....	.7585	.7415	.017
$\frac{7}{8}$ .....	.8840	.8660	.018
1	1.0095	.9905	.019
$1\frac{1}{8}$	1.1350	1.1150	.020
$1\frac{1}{4}$	1.2605	1.2395	.021

CHECK CHAINS.

In 1893 the use of truck and car body check chains, properly applied, was adopted as a Recommended Practice. See Proceedings 1874, pages 27 and 72; Proceedings 1893. In 1896 it was agreed that this recommendation referred to passenger equipment cars only.

MARKING CARS.

In 1893 a Recommended Practice was adopted as follows :

That all railroad companies having the same initials as other railroad companies, should stencil the name of the road in full on some part of the car where it may be readily seen. See Proceedings 1882, page 158 ; Proceedings 1893.

AIR-BRAKE REPAIR CARD.

In 1894 a Recommended Practice was adopted to use an air-brake repair card to report to division terminals such defects as are found by trainmen which require brake to be cut out. This was revised in 1898, and is now as below, to be attached as near to the car number as possible :

THE RAILWAY CO.
AIR-BRAKE CUT-OUT CARD.

Applied to Car No. Initials

Date at

By Inspector.

By Cond'r. Train No.

Defects

USE FIGURES TO DESIGNATE DEFECTS.

The Railway Co.

AIR-BRAKE CUT-OUT.
 CAR CAN BE PLACED BETWEEN AIR-BRAKE CARS.

Card Applied at

Car No. Initials Date

DEFECTS.		Train No.
1 TRIPLE VALVE.	4 CYLINDER PACKING.	11 BRAKE RIGGING.
2 RESERVOIR.	6 RELEASE COCK.	12 ODD BRAKE.
3 CYLINDER.	8 CROSS-OVER PIPE.	13

By Inspector. | By Conductor.

..... DIVISION.

THE RAILWAY CO.
DEFECTIVE AIR-BRAKE CARD.

Applied to Car No. Initials

Date at

By Inspector.

By Cond'r. Train No.

Defects

USE FIGURES TO DESIGNATE DEFECTS.

The Railway Co.

DEFECTIVE AIR BRAKE.
 CAR CANNOT BE PLACED BETWEEN AIR-BRAKE CARS.

Card Applied at

Car No. Initials Date

DEFECTS.		Train No.
1 TRIPLE VALVE.	6 RELEASE COCK.	11 BRAKE RIGGING.
2 RESERVOIR.	7 ANGLE COCK.	12 ODD BRAKE.
3 CYLINDER.	8 CROSS-OVER PIPE.	13
4 CYLINDER PACKING.	9 TRAIN PIPE.	
5 CUT-OUT COCK.	10 HOSE CONNECTION.	

By Inspector. | By Conductor.

..... DIVISION.

AIR BRAKE AND SIGNAL INSTRUCTIONS.

In 1898 the Air Brake and Signal Instructions which had been in use since 1892 were slightly revised and adopted as a Recommended Practice of the Association. These instructions were also approved by the American Railway Master Mechanics' Association as originally adopted in 1892 and as revised in 1898. For instructions in detail, see Appendix A.

PROTECTION OF TRAINMEN.

Sheet M. C. B.—A.

In 1893 a Recommended Practice was adopted to protect trainmen from accident, under the subheads as given. In 1896 some changes were made, especially in regard to handholds, and by the elimination of various details from drawing.

Position of Brake Shafts.

The brake shaft to be placed on what is the left-hand corner of the car when a person is standing on the track facing the end of the car. The ratchet wheel and brake pawl to be fastened to a suitable casting attached to the roof. The center of the brake shaft to be 20 inches from the middle of the car.

See Proceedings 1888, pages 25 and 123 ; Proceedings 1893 and 1896.

Running Boards.

The ends of the running boards of box cars to be made to project over the ends of the cars, and properly supported, so that the end of running board shall not be more than 6 inches back of face of buffer block. The running board shall be made not less than 18 inches wide.

See Proceedings 1888, pages 24 and 123 ; Proceedings 1893 and 1896.

Steps.

Two good substantial steps, to be made of wrought iron, about $\frac{1}{2}$ by $1\frac{1}{2}$ inches section, to be fastened, one to each side sill, next to the corner of the car to which the ladder is attached. The steps to be not less than 12 inches long, measured horizontally between the sides, and the tread to be not less than 8 inches below the bottom of the sill. The side of the step next to the corner of the car to be as near to the end of the car as is practicable. Each side of the step to be fastened to the sill with two $\frac{1}{2}$ -inch bolts and nuts.

See Proceedings 1888, pages 25 and 121 ; Proceedings 1893.

Ladders.

Each box and stock car should have two iron or wooden ladders with not less than five steps to each ladder ; steps, if of iron, to be not less than $\frac{3}{8}$ inch diameter ; if of wood, to be not less than $1\frac{1}{2}$ by 2 inches, and to be made of hardwood ; the steps to be not less than $2\frac{1}{2}$ inches from side or end of car ; each ladder to have a handhold on the roof directly over top of ladder. When iron ladders are used and placed on ends of car, the bottom step to have a guard or projection to prevent men from slipping when swinging around the end of car to get on the step.

Handholds.

Box and stock cars constructed with projecting end sills with end ladders, should be provided with a horizontal grabiron or handhold about 24 inches long on side of car over each step, located about $27\frac{1}{2}$ inches above center line of drawbar. The end ladder should be located on left-hand side of end of car and one horizontal grabiron or handhold, about 24 inches long, on right-hand side of end of car about $27\frac{1}{2}$ inches above center line of drawbar, the lower rung of ladder being a suitable grabiron for opposite side of end of car, as shown on Plate A.

Box and stock cars constructed with projecting end sills with side ladders located over steps, the lower rung of such ladders is an effective grab. They should also be provided with two horizontal end grabirons or handholds, about 24 inches long, located on each side of end of car about $27\frac{1}{2}$ inches above the center line of drawbar, as shown on Plate A—2.

Box and stock cars not constructed with projecting end sills, and which have end ladders, should be provided with horizontal grabiron or handhold about 24 inches long on side of car over each step, located about $27\frac{1}{2}$ inches above center line of drawbar. The end ladder should be located on left-hand side of end of car and one horizontal grabiron or handhold about 24 inches long on right-hand side of end of car about $27\frac{1}{2}$ inches above center line of drawbar, the lower rung of ladder being a suitable grab for that side of end of car, as shown on Plate A—3. End ladders constructed without side frames should have the lower rung provided with a guard to prevent the foot from slipping off.

On box and stock cars not constructed with projecting end sills, and which have side ladders located over steps, the lower rung of such ladder is an effective grab. They should be provided with two horizontal end grabirons or handholds about 24 inches long, located on right-hand side of end of car about $27\frac{1}{2}$ inches above center line of drawbar, as shown on Plate A—4.

All gondolas with drop ends to be provided with horizontal grabirons or handholds on sides of car over each step, about 24 inches long, located as high as possible, but not exceeding the measurement of $27\frac{1}{2}$ inches above center line of drawbar, and two grabirons or handholds placed under the sill at end of car as near the face as will insure a good safe fastening, the outside end of it to be in line with the inside face of the side sill, and to be about 18 inches long with a space not less than 3 inches between it and the end sill, as shown on Plate A—5. If preferred, the end handholds may be placed on the face of the end sill, as shown in the alternate illustration, A—5.

All high-side, fixed-end gondolas should be equipped with a vertical grabiron or handhold over steps on the sides of the car, about 24 inches long, the lower end to be placed about 6 inches above the floor of the car, and two horizontal grabirons or handholds on each end of car, about 24 inches long, 4 inches from the outside of car and $27\frac{1}{2}$ inches above center line of drawbar; exception to be made where the car is provided with a brake step, in which case the bracket of the brake step can be used as a grabiron on that side of end of car, as shown on Plate A—6, for low sides. It is also recommended that where the

side of a gondola car is too high for a man standing on the step to reach the top, there should be two additional vertical grabirons or handholds placed on each side of end of car, extending from within 4 inches of the top, to be about 18 inches long, as shown on Plate A—6 for high sides.

Tank cars should be provided with horizontal grabirons or handholds, about 24 inches long, on sides over steps; but cars provided with safety railings on sides do not require side grabirons or handholds, but should be provided with two end grabirons or handholds, about 18 inches long, located on under side of end sill, the same as for drop-end gondolas, and as shown on Plate A—7. If preferred, the end handholds may be placed on the face of the end sill, as shown in the alternate illustration, Plate A—7.

All flat cars to be provided with horizontal grabirons or handholds on sides of cars over steps, about 24 inches long, and if not equipped with step, one grabiron or handhold on each side near end of car, where coupler unlocking rod is located, and two end grabirons or handholds, about 18 inches long, placed under the sill as near the face as will insure a good safe fastening, the same as for drop-end gondolas, and as shown on Plate A—8. If preferred, the end handholds may be placed on the face of the end sill, as shown in the alternate illustration, Plate A—8.

It is also recommended that all grabirons or handholds shall be secured by through bolts of $\frac{1}{2}$ -inch diameter, with nuts on the outside and riveted over wherever it is possible to do so, and where lag screws are used they shall be not less than $\frac{1}{2}$ inch diameter and 3 inches long, and screwed into solid wood.

Handholds on end sills should have at least 2 inches clearance behind them, and all other handholds should have at least $2\frac{1}{2}$ inches clearance behind them.

All handholds should be made of iron not less than $\frac{3}{8}$ inch diameter; handholds on sides and ends of cars should be about 24 inches long in the clear; those on end sills to be made shorter only when it is impossible to use this length.

See Proceedings 1879, pages 109, 110 and 111; Proceedings 1893; Proceedings 1894; Proceedings 1896.

PLATFORM SAFETY CHAINS.

In 1893 a Recommended Practice was adopted for location and details of platform safety chains for passenger equipment cars. See Proceedings 1890 and 1893. In 1896 this was modified as follows: Platform Safety Chains for passenger equipment cars to be located $14\frac{1}{2}$ inches each side of center; to be suitably attached to under side of platform timbers, and to be of such length that when extended horizontally the chain with hook shall measure $12\frac{3}{4}$ inches from face of end timber to bearing point of hook, and the chain with eye shall measure $2\frac{3}{4}$ inches from face of end timber to bearing point of eye. The hook shall not be more than $1\frac{1}{4}$ inches thick transversely, and the eye shall not be less than $1\frac{1}{2}$ inches wide, or less than 4 inches long in its opening. When facing end of car the chain fitted with hook shall be on the left-hand side, and the chain fitted with eye on the right-hand side. See Proceedings 1896.

MARKING FAST FREIGHT LINE CARS.

Sheet M. C. B.—A.

In 1893 a Recommended Practice was adopted for marking Fast Freight Line Cars as shown on Sheet M. C. B.—A.

It was resolved:

1st. The half of sides of car on which the doors do not slide, to show the name of the "Fast Freight Line," spelled out in full, and the car number, in the Fast Freight Line series, immediately below it. In the same panel and within two feet of the sill shall appear, in letters not over four inches high, the name of the railroad company owning or contributing the car, and between the same and the sill shall appear the light weight of the car, with such other information as it is found advisable to give in connection with same.

2d. Side doors to bear the initials of the road to which the car belongs, or the name of the line on which the car is used, together with the number of the car.

3d. The ends to show the initials of the "Fast Freight Line," with the car number, in the Fast Freight Line series, and the light weight just below them; no other marks will appear on ends of car.

4th. The half sides of cars on which the doors do slide, to be reserved for advertising symbols or trade-marks where used. The use of profuse lettering in this panel is to be discouraged, however, and it is recommended that only the simplest trade-marks or advertising signs shall be used; the capacity of the car to appear near the sill in this same panel.

See Proceedings 1884, pages 96, 156 and 162; Proceedings 1893.

ARCH BARS AND COLUMN BOLT FOR 86,000-POUND CAPACITY CAR.

Sheet M. C. B.—A.

In 1897 a committee on this subject reported designs which were subsequently adopted by letter ballot as Recommended Practice of the Association. See Sheet M. C. B.—A. Proceedings 1897, pages 188 to 192.

ATTACHMENT OF COUPLERS TO CARS.

Sheet M. C. B.—B.

In 1893 a Recommended Practice was adopted for attaching M. C. B. automatic couplers to cars, as shown on Sheet B, and by a separate vote the use of a draft spring, $6\frac{1}{4}$ inches diameter, 8 inches long, with $2\frac{1}{8}$ inches motion was recommended. At that time the capacity of the spring was placed at 22,000 pounds, but this was changed in 1896 to 19,000 pounds to better accord with the facts. See Proceedings 1893 and 1896.

In 1897 the yoke or pocket strap shown in detail on Sheet M. C. B.—B. was adopted as standard of the Association, with the addition of $\frac{1}{4}$ inch radius at back end. See Sheet M. C. B. 11.

In 1897 the buffer block and location shown on Sheet M. C. B.—B., but with some additional details of buffer block, were adopted as standard of the Association. See Sheet M. C. B. 11.

UNCOUPLING ARRANGEMENTS FOR M. C. B. COUPLERS.

Sheet M. C. B.—B.

In 1897 a committee reported on uncoupling arrangements for M. C. B. couplers, submitting designs shown on Sheet M. C. B.—B., which were subsequently adopted as Recommended Practice of the Association.

The report of the committee, also adopted, contained the following reference to these designs :

"Diagram No. 1 shows the application of the proposed standard parts to a car with concealed end sills with the parts of the dimensions and located as shown on "Plate B, Recommended Practice for Attaching Automatic Couplers to Cars," arranged to operate the lock in a coupler having the lock located on the vertical center line of the coupler.

"Diagram No. 2 shows the application to the same design of car with the center of the lock located three inches from the vertical center line of the coupler. Within these limits are located the locks on the great majority of couplers in service.

"Diagram No. 3 shows the application to a car having projecting end sills. The bracket supporting the end of the release rod farthest from the coupler is provided with a projection to enable the lock of the coupler to be held in the raised position by pushing the rod toward the center of the car, after being raised, until the outer arm engages the projection, a feature which with many designs of couplers is necessary.

"The dimensions of the parts as shown will be suitable for all cars with dead blocks of the dimensions as shown on 'Plate B, Recommended Practice,' and with end sills 8 or 9 inches in depth ; for cars with these parts of different depths the proper adjustment can be made by changing the relation of the arms of the lever to bring the center of the eye of the horizontal arm to the proper height above the eye of the lock or by the use of links of different lengths.

"There are some designs of M. C. B. couplers in use in which the lock is operated from the side or from beneath. As each type has a distinctive method of operating the lock, your committee did not think it necessary to consider them in this report, although some such types are used in considerable quantities."

JOURNAL BEARING AND WEDGE GAUGES.

Sheet M. C. B.—C.

In 1894 a Recommended Practice was adopted for Gauges for Journal Bearings and Wedges, to insure their proper interchangeability and freedom from binding when in place. The set comprises :

- | | | | |
|-----|-------------------|----------------------|-----------------------|
| Two | Bearing and Wedge | Cross-Section | Gauges. |
| " | " | " | " |
| " | " | Longitudinal-Section | Gauges. |
| " | " | Flanged Side Lug | Gauges. |
| " | " | Bore | Gauges. |
| One | " | Thickness Gauge, | common to both sides. |

In 1898 the radius of both bearing bore gauges was reduced $\frac{1}{16}$ inch on drawing, to correspond strictly with M. C. B. Standards shown on sheets 3 and 6. This sheet was also modified in 1898 by the omission of the Dummy coupling previously shown thereon.

SAFETY CHAINS FOR FREIGHT CARS.

Sheet M. C. B.—C.

In 1894 a Recommended Practice was adopted for Safety Chains for Freight Cars, when such chains are used. The use of safety chains on freight cars was not recommended, but when they are used on cars for special service a location is recommended as shown.

MINIMUM THICKNESS FOR STEEL TIRES.

Sheet M. C. B.—C.

In 1894 a Recommended Practice was adopted for Minimum Thickness for Steel Tires of Car Wheels, to be 1 inch, to be measured normal to the tread and radial to the curved portions of the flange through the thinnest part within $4\frac{1}{4}$ inches from the back of the flange; the thickness from the latter point to the outer edge of tread to be not less than $\frac{1}{2}$ inch at thinnest part as shown on Sheet M. C. B.—C.

A further practice was adopted of cutting a small groove, as shown in the outer face of all tires when wheels are new, at a radius $\frac{1}{4}$ inch less than that of the tread of tire when worn to the prescribed limit, to facilitate inspection.

LOADING POLES, LOGS AND BARK ON CARS.

Sheet M. C. B.—D.

In 1893 a Recommended Practice was adopted for loading logs and poles on cars and for racking cars for loading bark, and in 1896 extended rules governing the loading of lumber and timber on open cars were adopted, replacing the former practice heretofore shown on Sheet M. C. B.—B, with the exception of racking cars for loading bark. At the same time rules governing the loading of long structural material, rails, plates, girders, etc., were adopted. See Sheet M. C. B.—D.

In 1897 some modification of these rules was adopted, with slight changes in the illustrations also. In 1898 still further slight changes were made in the text and in some of the drawings, and a new section was added containing rules for loading large logs, pipe and stone on open cars. For present Recommended Practice see Appendix B.

MOUNTING WHEELS.

M. C. B.—E.

In 1896 it was decided by letter ballot that a gauge for determining the center of the axle between centers of journal be used, and that all axles be carefully centered between centers of journals prior to mounting, and that a

gauge for locating the wheels equidistant from the center of the axle, as thus determined and shown in Plate E, should be used in mounting wheels.

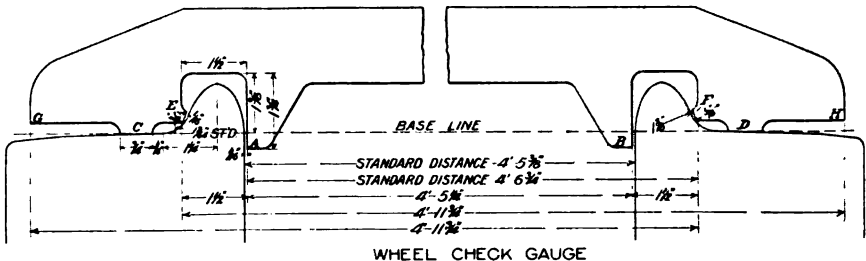
In 1897 the Recommended Practice for mounting wheels was modified by letter ballot by the omission of that part providing, among other things, that wheels with flanges worn to a thickness of $1\frac{1}{8}$ inches or less should not be remounted, and the substitution therefor of the following :

First.—That wheels with flanges worn to a thickness of $1\frac{1}{8}$ inches or less shall not be remounted.

Second.—That the thickness of flanges of wheels fitted on the same axle should be equal and should never vary more than $\frac{1}{8}$ inch.

Third.—That in mounting wheels, new or secondhand, the standard wheel check gauge should be used in the following manner :

After one wheel is pressed into position, place the stop "A" or "B" of the check gauge against the inside of the flange of the wheel with the thinner



flange with the corresponding tread stop "C" or "D" against the tread of the wheel. Press the other wheel on the axle until the opposite tread stop comes in contact with the tread with the corresponding gauge point "E" or "F" in contact with the outside of the thicker flange.

ADJUSTING HEIGHT OF DRAWBARS.

In 1896 it was decided that in adjusting the height of drawbars to meet the requirements of the United States law fixing the height from the top of rail to center of drawbar for standard gauge cars in interstate traffic, cars should be adjusted when empty, as far as possible. In order to justify a bill for work done under the Rules of Interchange, an empty car should be adjusted to $34\frac{1}{2}$ inches, or within $\frac{1}{4}$ inch thereof, and when it is necessary to alter a loaded car it should be adjusted to $33\frac{1}{2}$ inches, or within $\frac{1}{4}$ inch thereof, or as near as possible to such height as will bring it to $34\frac{1}{2}$ inches when the car is unloaded.

STENCILING CARS.

In 1896 it was decided :

That on all box cars standing more than twelve (12) feet from top of rail to eaves, the width at eaves be stenciled in 3-inch letters on side of car, as near the bottom as convenient.

That all box, stock and other roofed cars have the number and initials stenciled in 3-inch letters on outer face of outer floor timber between cross-tie timbers, except where cars are ceiled over underneath, in which case the stenciling shall be put on inside face of each cross-tie timber in center.

That all classes of cars have style of coupler and rear attachments, and style of brake beams stenciled in not less than $1\frac{1}{2}$ -inch letters near one end of car on each side, or on each end of car directly above the buffer blocks where design of car permits it.

That where the construction of the truck permits, trucks shall be stenciled on each side, giving the size of journal, and the letters "M. C. B." if the axle is M. C. B. standard axle. If the axle is not M. C. B. standard, use dimensions from center to center of journal in place of M. C. B. This stenciling to be in $1\frac{1}{4}$ -inch letters, and to be put on end or side of bolster in Diamond trucks, and on side-truck frame in center on pedestal type of trucks.

That on all cars equipped with air brakes, the words "Air Brake," in letters not less than 3 inches high, be stenciled on the sides or ends of the cars, and that the make of air-brake equipment be stenciled (in smaller letters if desired) over or just preceding these words, to enable inspectors to detect repairs made with wrong material. Initials of the road should also appear in letters not less than 2 inches high on one side of bolster or transom of each truck.

AIR-BRAKE TESTS.

In 1895 a code for the guidance of the Committee on Air-Brake Tests in testing triple valves was adopted as Recommended Practice for such tests, which code is as follows:

CONDITIONS OF TESTS.

No. 1.—CONSTRUCTION OF RACK.—Brakes will be tested on a rack representing the piping of a fifty 34-foot car train. All cocks, angles and connections will be as nearly as possible identical with those in train service. The rack shall conform to a blue print which is in the hands of the committee, which gives the proper fitting, piping, dimensions of cylinder, auxiliary reservoirs, main reservoirs, engineer's valve, etc.

No. 2.—PRESSURE.—Tests will be made with a uniform train-pipe pressure of 70 pounds.

No. 3.—CONSTRUCTION OF TRIPLES.—Triples must be constructed so that they can be secured and operated on apparatus conforming to diagrams, Figs. 1 and 2 (see pages 166 and 167 of the 1892 Annual Report).

No. 4.—To secure accuracy in measurement of time application and release tests, electrical recording apparatus will be used, arranged to give an indicator card in the fiftieth car.

No. 5.—Tests shall be repeated three times under the same general conditions. The temperature at the time of the tests will be recorded.

No. 6.—CLASSIFICATION.—Triples shall be classified Nos. 1, 2, 3 and outlawed. In grading triples the reasons for their classification shall be given.

No. 7.—The three essentials for a quick-action brake are as follows :

First. Graduation.

Second. Release.

Third. Quick action.

RACK TESTS.

No. 1.—APPLICATION TEST (a) (SERVICE).—Brakes must show with full service application and 6 inches piston travel, a brake cylinder pressure of 50 pounds. The minimum pressure must not be less than 48 pounds, nor the maximum pressure over 52 pounds. This test will be made with :

(1) 4 inches piston travel.

(2) 6 inches piston travel.

(3) 12 inches piston travel.

The necessity for the 4-inch and 12-inch piston travel tests will depend upon the character of the brakes being tested.

NOTE.—The object of this test is to secure such proportion between the auxiliary reservoir and the brake cylinder as will give the desired maximum power in a full service application of the brake.

No. 2.—APPLICATION TEST (b) (EMERGENCY).—Brakes must be applied on the fiftieth car with at least 45 pounds pressure with 6 inches piston travel in three seconds from the first movement of the engineer's handle. They should indicate at least 55 pounds in three and one-half ($3\frac{1}{2}$) seconds. The final maximum pressure in this test must not be less than 15 per cent, nor more than 20 per cent, above the pressure given by the same brake in full service application.

This test will be made to determine that quick action is obtained in each case, with

(1) 4 inches piston travel.

(2) 6 inches piston travel.

(3) 12 inches piston travel.

NOTE.—The object of this test is to secure, as nearly as possible, uniformity of pressures in the brake cylinders in an emergency application, and as nearly as possible a uniformity of time required to attain the pressures; to secure a minimum length of stop, of shock and of trains parting.

No. 3.—APPLICATION TEST (c).—Commencing with the first car from the engine, the brakes of three successive cars, or less, if they fail to jump three, will be cut out until the fifth, sixth and seventh are cut out, the brakes in each case to be applied as per Test No. 2. After the first series of three has been tested, in order to test the second series the first car must be cut in, and so on. The quick-action brake should pass the three cars cut out and apply on the fiftieth car in the same time as in Test No. 2. Tests will be made with piston travel of 4 inches.

In addition, at least two other applications shall be made with three successive triples cut out in any portion of the rack beyond the fifth car.

NOTE.—In freight-car service the most common method of remedying a defective brake is to cut the brake out; hence it is essential that a limited number of brakes can be cut out successfully without destroying the quick-action feature.

NO. 4.—GRADUATING TEST (a).—Seventy pounds train-pipe pressure having been secured, the following tests will be made :

(1) A reduction of 8 pounds in train-pipe pressure. This should apply lightly the fifty brakes.

(2) A further reduction of 4 to 6 pounds. This should increase the braking power on all the brakes.

(3) A reduction to 30 pounds should equalize the pressure between the auxiliary reservoirs and brake cylinders. The piston travel in this test will be six inches.

(b).—One or more triples shall also be tested, having substituted for the brake cylinder a reservoir having the capacity of a cylinder with 8-inch stroke. The first admission to the cylinder should be made with a reduction of train-pipe pressure not exceeding five pounds, each succeeding reduction should reduce the pressure in the auxiliary reservoir not to exceed three pounds, until full equalization takes place. The pressure in the train pipe should not be more than three pounds lower than the equalized pressure in the brake cylinder and reservoir at full equalization.

NO. 5.—TEST TO DETERMINE THE SENSITIVENESS OF THE SERVICE VALVE.—Three valves selected at random will be taken for this test and each tried separately. They will be tested on a train pipe representing a locomotive and one car, the engine and tender brake being cut out.

A train-pipe pressure of 70 pounds having been secured, the air will be discharged as rapidly as it may through an opening in the engineer's valve of two sixty-fourths to three sixty-fourths (2 to 3-64) inch diameter. Under this condition the service action must take place and continue to take place without any appearance of quick action (P E, Partial Emergency) until the disk has been enlarged up to and including a 10-64 opening.

NOTE.—The object of this test is to insure the working of triples in "service" with practically the same reduction of air.

NO. 6.—TEST TO DETERMINE THE SENSITIVENESS OF THE QUICK-ACTION VALVE.—The same three valves as in No. 5, or others selected at random, will be taken for this test and each tried separately. They will be tested under the same train-pipe conditions as Test No. 5. Engine and tender brake cut out.

A train-pipe pressure of 70 pounds having been secured, the air will be discharged as rapidly as it may through disk openings, as in the preceding test, increasing in diameter by 1-64. Triples must not show a range of more than 3-64 before full quick action is reached. Full quick action must not take place before 11-64, but must take place when the opening is 14-64.

NOTE.—The object of this test is to check the introduction of triples which will cause a quick-action application when not wanted.

NO. 7.—TEST TO DETERMINE THE HOLDING POWER OF THE BRAKE IN SERVICE APPLICATION AND QUICK-ACTION APPLICATION.

(a) SERVICE APPLICATION. —Gauges will be placed on the cylinder and auxiliary reservoir of the first, twenty-fifth and fiftieth cars with 70 pounds train-pipe pressure ; brakes will be applied by admitting, as nearly as may be,

15 pounds into the cylinder of the first car. Record of pressure in the auxiliary reservoirs and cylinders will be taken as follows :

- (1) At the first application.
- (2) In five minutes from first application.
- (3) In ten minutes from first application.
- (4) In fifteen minutes from first application.
- (b) QUICK-ACTION APPLICATION.—This will be the same as above, except that all the air will be exhausted from the train pipe.
- (c) DUMMY CYLINDER TEST.—A modification of the holding test, as with the graduating test by the introduction of dummy cylinders.

NO. 8.—RELEASE TEST.—The following conditions should be observed in this test :

- (a) Main air reservoir cut in.
- (b) Any pump or boiler pressure may be used that will maintain a uniform head of 90 pounds pressure.

A uniform pressure of 70 pounds having been secured in the train pipe, all the air will be exhausted by a quick-action application. A pressure of 90 pounds will then be maintained against a diaphragm perforated by a 3-32 hole, and a record taken of all brakes that release inside thirty minutes. In making this test special care must be taken to see that there is no leak in the train pipe.

It will not be considered satisfactory if a greater proportion than ten per cent fail to release in the prescribed time.

NOTE.—This test, in addition to testing the release feature of the triples, is intended as an equivalent to a release after a break-in-two in train service.

NO. 9.—TEST TO DETERMINE THE TIME OF CHARGING ONE AUXILIARY RESERVOIR :

- (a) Cut out the brake to be tested by the cut-out cock.
- (b) Bleed the auxiliary reservoir empty and close the bleed cock.
- (c) Keep the pump running and maintain a head of 90 pounds in main air reservoir and train pipe during test.
- (e) Cut in the brake to be tested and note from the reading of the gauge the time occupied in charging to 70 pounds. The time of charging should be 55 seconds. The reservoir should not be charged in less than 45 seconds nor more than 60 seconds.

NOTE.—The object of this test is to prevent irregular charging of auxiliary reservoirs and thus insure that the front brakes will not apply after charging.

NO. 10.—TEST TO DETERMINE WHETHER QUICK ACTION WILL FOLLOW A SERVICE APPLICATION :

Commencing with a service application of 20 pounds pressure in the first cylinder a full quick-action reduction will follow. It will be observed whether quick action takes place or not. The pressure in the first cylinder will be increased or decreased by steps of about 5 pounds until the point at which quick action ceases or commences is determined. Quick action should take place with not less than 20 pounds in the first cylinder.

NOTE.—The object of this test is to determine whether, after a service application, quick action can be obtained without first releasing the brakes.

No. 11.—Such additional tests as in the judgment of the committee the construction of the triples submitted to them for test warrants.

TRAIN TESTS.

No. 1.—In order to provide against defects which a rack test may not develop, it is recommended that railroads make a 50-car train test in actual service before accepting the result from the rack test as final.

No. 2.—In making application test No. 2 with a train, the measurement of time from the first car to the fiftieth car should be provided for. This will determine the time occupied by the engine brake as against the car brake.

No. 3.—Special care should be taken with the engine and tank brakes in order that they may do their share of the braking during the stops, and not pull away from the train.

No. 4.—All brake shoes must have a proper bearing on wheels, which is best accomplished by giving them some previous service before testing, and all should be of the same material.

No. 5.—Tests to determine the shock should be made on a level track, with all the slack in the train pulled out at the time the brakes are applied.

BOX CAR SIDE DOOR AND END DOOR FIXTURES.

Sheet M. C. B.—F.

In 1897 a committee on this subject reported with details which were afterward adopted by letter ballot as Recommended Practice of the Association. See Sheet M. C. B.—F. Proceedings 1897, page 186.

GENERAL DIMENSIONS FOR CARS WITH STEEL UNDERFRAMING.

In 1897 individual designs for steel underframing for freight cars were submitted, and the persons submitting such designs agreed on general recommendations as follows, which were submitted to letter ballot and adopted as Recommended Practice of the Association :

First.—That the inside length should be 34 feet for a standard box car of 60,000 pounds capacity.

Second.—The inside width should be 8 feet 4 inches for a standard box car of 60,000 pounds capacity.

Third.—The height from the top of the floor to the top of the plate should be 7 feet 6 inches for a standard box car of 60,000 pounds capacity.

Fourth.—The width of the side door should be 5 feet 4 inches clear for all box cars.

Fifth.—The end doors, if any are used, should be 24 inches wide by 36 inches high.

Sixth.—The height from the top of the rail to the top of the floor should be 4 feet 2 inches.

Seventh.—The design should show the end sill flush, and not projecting beyond the siding.

The dimensions above given for standard interchange box cars, as far as length of sills, width, and height from the rail are concerned, should be

adopted also for other flat bottom freight cars of 60,000 pounds capacity, such as stock, gondola and flat cars, so that same style of sills, bolsters, end sills and draft gear will suit for all these classes of cars of the same capacity. The cubic capacity for interchange box cars should be 70 cubic feet per ton of 2,000 pounds.

PASSENGER CAR PEDESTAL AND JOURNAL BOX.

For Journals, $4\frac{1}{4}$ by 8 inches. Sheets M. C. B.—G and H.

In 1898 a Recommended Practice was adopted for pedestal and journal box for $4\frac{1}{4}$ by 8 inch journals for passenger cars. See sheets M. C. B.—G and H.

FLETCHER JOURNAL BOX LID FOR CARS OF 80,000 POUNDS CAPACITY.

Sheet M. C. B.—I.

In 1896 a committee proposed standards for axle and journal box complete, with contained parts, for cars of 80,000 pounds capacity. After discussion of the report by the convention, it was decided to submit all the recommendations, as slightly modified by this discussion, to letter ballot for adoption as a Recommended Practice for one year, when they could be adopted as standard if found satisfactory. In 1898 this axle and journal box were adopted as standards (see sheets 7, 13, 14 and 15), but the details of Fletcher lid when used with this box remain as Recommended Practice (see Sheet I).

SPRINGS FOR FREIGHT CAR TRUCKS.

Sheet M. C. B.—J.

In 1898 detail designs of spring coils and caps suitable therefor were adopted as Recommended Practice. See Sheet M. C. B.—J.

The following from the committee's report is included for a clear understanding :

Spring A.—5 inches diameter, $\frac{5}{8}$ inch diameter steel, $5\frac{7}{8}$ inches free height ; to carry 3,500 pounds at 5 inches ; weight, $10\frac{3}{4}$ pounds.

Spring B.— $3\frac{1}{8}$ inches diameter, $\frac{5}{8}$ inch diameter steel, $5\frac{7}{8}$ inches free height ; to carry 1,150 pounds at 5 inches ; weight, 4 pounds.

Spring C.—7 inches diameter, $1\frac{1}{8}$ inch diameter steel, 7 inches free height ; to carry 8,000 pounds at 6 inches ; weight, $24\frac{1}{2}$ pounds.

Spring D.— $4\frac{1}{4}$ inches diameter, $\frac{7}{8}$ inch diameter steel, 7 inches free height ; to carry 4,500 pounds at 6 inches ; weight, $9\frac{1}{2}$ pounds.

Spring E.— $7\frac{1}{2}$ inches diameter, $1\frac{3}{8}$ inch diameter steel, $7\frac{1}{2}$ inches free height ; to carry 11,000 pounds at $6\frac{1}{2}$ inches ; weight, 32 pounds.

Spring F.— $4\frac{1}{2}$ inches diameter, $\frac{7}{8}$ inch diameter steel, $7\frac{1}{2}$ inches free height ; to carry 5,000 pounds at $6\frac{1}{2}$ inches ; weight, $12\frac{1}{2}$ pounds.

By reference to the column headed " Arch Bar Trucks," in the schedule submitted, it will be seen that the carrying capacities of the groups recommended increase by fairly regular gradations. To enable the recommended coils to be most generally and economically useful, such groups can be selected and used as come nearest in capacity to the actual load to be carried, without

reference to the marked carrying capacity of the car. Thus a heavy refrigerator car of 50,000 pounds capacity and a flat car of 70,000 pounds capacity may use the same combination of springs, on account of the great difference in light weight of the bodies.

If this plan is followed, the committee would recommend that the number and class letter of the coils to be used in each truck should be stenciled on the truck to prevent mistakes being made by repairmen.

To meet the greatest possible variety of conditions, drawings for spring caps are submitted, showing caps for springs C and D or E and F, to be used in groups of four, or in groups of two, the smaller coils being placed inside the larger ones. Your committee recommends that the springs and caps submitted, and the schedule for their use, be referred to letter ballot for adoption as Recommended Practice.

SCHEDULE FOR THE USE OF RECOMMENDED SPRINGS.

Capacity of Car.	Arch-Bar Trucks — Per Group.					Pedestal Trucks — Per Box.			
	No. of Coils.	Capacity, Lbs.	At.	Weight, Lbs.	Cap.	No. of Coils.	Capacity, Lbs.	At.	Weight, Lbs.
			Inches					Inches	
40,000 Lbs.	4 of A	14,000	5¼	43	No. 1	.....	.....	....	....
50,000 Lbs.	4 of A	16,300	5¼	51	No. 1	1 of C	8,000	6	24½
	2 of B				No. 2	.....	.....	...	....
60,000 Lbs.	5 of A	17,500	5¼	53½	No. 2	.....	.....	...	....
	4 of A	18,600	5¼	59	No. 1	1 of C	12,500	6	34
	4 of B				No. 1	1 of D			
	6 of A	21,000	5¼	64½	No. 3	.....	.....	....	....
70,000 Lbs.	2 of C	25,000	6¼	68	No. 4 or No. 5	1 of E	16,000	6½	44½
	2 of D				No. 5	1 of F			
80,000 Lbs.	2 of E	32,000	6¾	89	No. 6 or No. 7	1 of E	17,000	6¼	44½
	2 of F				No. 7	1 of F			

NOTE.—Heights given in above include spring caps for arch-bar trucks.

Number and class letter of springs used to be stenciled on the trucks of cars.

COLLECTION OF SALT-WATER DRIPPINGS.

Sheet M. C. B.—J.

In 1898 the subject of rust on trucks and track from salt-water drippings from refrigerator cars was discussed, and a Recommended Practice for the collection of such drippings was adopted. See Sheet M. C. B.—J.

MISCELLANEOUS.

The following items, formerly among the Standards, are given on account of the recommendations of the Association and the information contained :

STORING OF LINE CARS ON FOREIGN ROADS.

At the Seventeenth Annual Convention, held in Chicago in June, 1883, the following resolutions were adopted (*see page 109 of the report of that meeting*) :

"Whereas, It is a common practice to store line cars on side tracks during summer months or dull times, away from home, after they have been in severe service; and

"Whereas, Many of the cars, after being so stored, are found to be more or less out of proper condition, so that they need more or less repairs, and when put into service cause much detention to traffic and many transfers;

"Be it Resolved, therefore, That it is the sense of this meeting that all line cars owned by foreign companies should be returned to their owners instead of being stored on foreign tracks, and that a competent man should be detailed to inspect the stored cars and to arrange to have the necessary repairs made during the time such cars are out of service."

DICTIONARY OF TERMS.

At the Fifth Annual Convention, held in Richmond, Virginia, in 1872 (*see page 18 of the report of that meeting*), it was

"Resolved, That a committee be appointed with power to publish an illustrated book, defining the proper terms or names of each and every part used in the construction of railway cars, and a description of the use of the same."

At the Fourteenth Annual Convention, held in Detroit in 1880 (*see pages 11 to 20 of the report of that meeting*),

"The committee to which was assigned the duty of preparing a dictionary of terms used in the construction of cars submitted a copy of the book and reported that it had finished its work, and it was discharged."

ENTERTAINMENTS.

At the Ninth Annual Convention, held in New York in 1875, the following resolution was adopted (*see page 113 of the report of that meeting*):

"Whereas, The practice of entertaining the members of this Association by its friends has become an established custom, and has thus assumed somewhat the character of an obligation to which those who have so generously dispensed hospitality have in a measure felt themselves obliged to conform; and

"Whereas, The expenditure of time and money for this purpose has in many cases been very much greater than the members of this Association have a right to expect should be devoted to their enjoyment; and

"Whereas, The expense of such hospitality has in some cases been interpreted as having a significance which has been the cause of embarrassment to members ;

"Therefore, We desire, by this resolution, first, to express our thanks for the liberality of our friends in the past ; and, secondly, to make the request in this public way that in the future there shall be no more expenditure of money for the public entertainment of members of this Association."

The preamble and resolution were unanimously adopted.

APPENDIX A.

AIR—BRAKE AND SIGNAL INSTRUCTIONS.

REVISED 1898.

GENERAL INSTRUCTIONS.

The following rules and instructions are issued for the government of all employes of this railroad whose duties bring them in contact with the maintenance or operation of the automatic air brake and train air signal. They must be obeyed in all respects, as employes will be held responsible for the observance of the same, as strictly as for the performance of any other duty.

Every employe whose duties are connected in any way with the operation of the air brake, will be examined from time to time as to his qualification for such duties, by the Inspector of Air Brakes or other person appointed by the proper authority, and a record will be kept of such examination.

A book of information will be issued, in convenient form, giving a complete explanation of all parts of the air brake and train air signal equipment, with directions for the care and operation of the same. Any employe of this railroad whose duties require a knowledge of the operation and maintenance of the air brake and air signal will be furnished with a copy of the same upon application at place designated by special notice, and every employe will be held responsible for a full knowledge of his duties in the operation or maintenance of the air brake or signal equipment. If the directions contained in that book are observed, and the rules and instructions herewith are obeyed, no failure of the air brake or train air signal, at the time when it is needed, should occur. If such a failure does occur, it will be assumed that some employe has neglected his duty, and an investigation will be made to ascertain who is responsible for such failure.

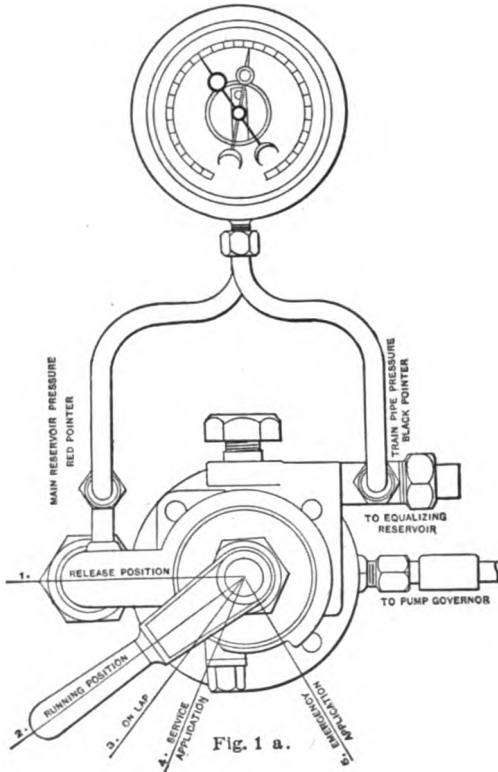
INSTRUCTIONS TO ENGINEMEN.

GENERAL.—Engineers, when taking their locomotives, must see that the air brake apparatus on engine and tender is in good working order; that the air pump and lubricator work properly; that the regulator prevents the train-pipe pressure exceeding a maximum of seventy (70) pounds; that an excess pressure of not less than twenty pounds can be maintained in the main reservoir when the handle of the engineer's brake valve is placed in position 2 (Running Position); that the engineer's brake valve works properly in all different positions of the handle; and that, when the brakes are fully applied, the driver brake pistons do not travel less than $\frac{1}{2}$ nor more than $\frac{3}{4}$ of their stroke, and the tender brake piston does not travel less than six nor more than nine inches. They must also know that the air signal responds properly by opening the stop cock of the air signal train line.

Engineers must report to roundhouse foreman, at the end of the run, any defect in the air brake or signal apparatus.

MAKING UP TRAINS AND TESTING BRAKES.—The train pipe under the tender must always be blown out thoroughly before connecting to the train. Be sure to

THE ENGINEER'S BRAKE AND EQUALIZING VALVE AND DUPLEX AIR GAUGE.



have not less than 90 pounds main reservoir pressure on the engine when connected to the train.

When the locomotive has been coupled to the train and it has been charged with an air pressure of 70 pounds, the engineer shall, at a signal from the inspector or trainman, apply the brakes with full service application of not less than 25 pounds reduction, and leave them so applied until the brakes on the entire train have been inspected and the signal is given to release. He shall then release the brakes, and shall not leave the station until it has been ascertained that all brakes are released and he has been informed by the inspector or trainmen. This test must be

made after each change in the make-up of the train, and before starting down such grades as may be designated by special instructions. Where the train air signal is used, the signal to release the brakes, in testing, will be given from the rear car of the train, to show that the signal connections have been properly made.

SERVICE APPLICATION.—In applying the brakes to steady the train upon descending grades, or for reducing the speed for any purpose, be very careful not to

THE ENGINEER'S BRAKE AND EQUALIZING VALVE AND DUPLEX AIR GAUGE.

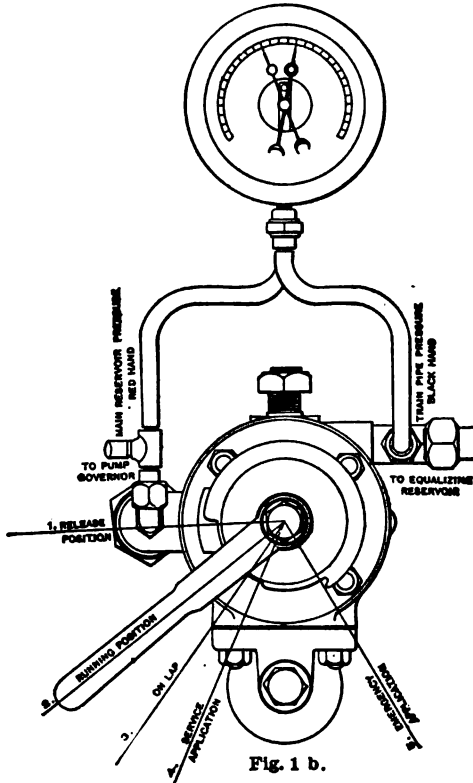


Fig. 1 b.

make too great a reduction of pressure in the outset, as the speed of the train will be too quickly or too much checked, and it will be necessary to release the brakes and apply them again later, perhaps repeating the operation. **APPLY THE BRAKES LIGHTLY AT A SUFFICIENT DISTANCE FROM THE STOPPING POINT, AND INCREASE THE BRAKING FORCE GRADUALLY, AS IS FOUND NECESSARY, SO AS TO MAKE THE STOP WITH ONE APPLICATION, OR AT MOST TWO APPLICATIONS OF THE BRAKES.**

With freight trains first allow the slack to run up against the locomotive. Great care must then be taken to apply the brakes with 5 to 7 pounds reduction and not make a second reduction until the effect of the first reduction is felt on entire train, in order to prevent shocks which otherwise may be serious.

In making a service stop with a passenger train, ALWAYS RELEASE THE BRAKES A SHORT DISTANCE BEFORE COMING TO A DEAD STOP, except on heavy grades, to prevent shocks at the instant of stopping. Even on moderate grades it is best to do

THE ANGLE COCK.

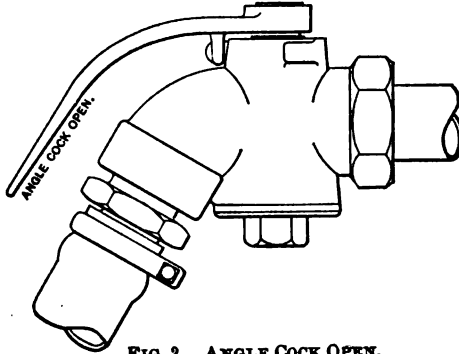


FIG. 2. ANGLE COCK OPEN.

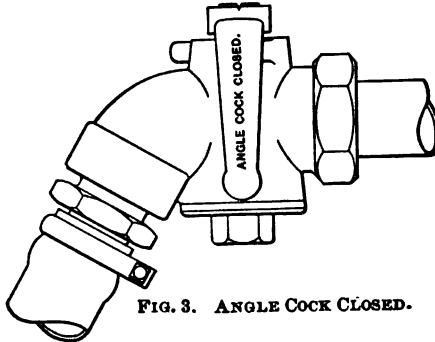


FIG. 3. ANGLE COCK CLOSED.

this, and then, after release, to apply the brakes lightly, to prevent the train starting, so that when ready to start the release will take place quickly. This does not apply to freight trains, upon which the brakes must not be released until the train has stopped.

EMERGENCY APPLICATIONS.—The emergency application of the brakes must not be used, except in actual emergencies.

BRAKES APPLIED FROM AN UNKNOWN CAUSE.—If it is found that the train is dragging at any time without a rapid fall of the black pointer, move the handle of the

engineer's valve into the full release position for a few seconds, and then return it to the running position.

If, however, the brakes go on suddenly, with a fall of the black pointer, it is evidence that (a) a conductor's valve has been opened, (b) a hose has burst or other serious leak has occurred, or (c) the train has parted.

In such an event, place the handle immediately in position 3, to prevent the escape of air from the main reservoir, and leave it there until the train has stopped, the brake apparatus has been examined and a signal to release is given.

THE PLAIN STRAIGHT-WAY COCK.

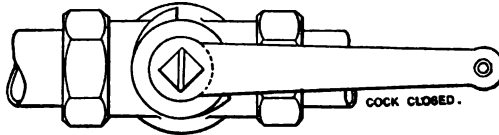


FIG. 4. COCK CLOSED.

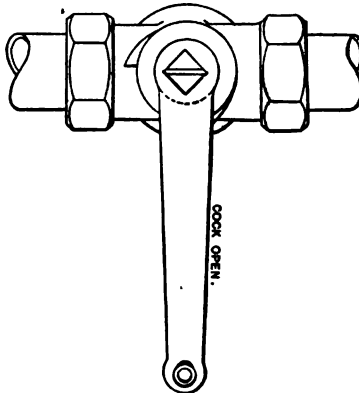


FIG. 5. COCK OPEN.

BRAKING BY HAND.—NEVER USE THE AIR BRAKE when it is known that the trainmen are operating the brakes of the air brake cars by hand, as there is danger of injury to the trainmen by so doing.

CUTTING OUT BRAKES.—THE DRIVER AND TENDER BRAKES MUST ALWAYS BE USED AUTOMATICALLY AT EVERY APPLICATION OF THE TRAIN BRAKES, unless defective — except upon such grades as shall be designated by special instructions.

When necessary to cut out either driver or tender brake, on account of defects, it shall be done by turning the handle of the four-way cock in the triple valve down to a position midway between a horizontal and a vertical position, first releasing the brake and leaving the bleed cock open. With the special driver brake triple valve, close the cut-out cock in the branch pipe.

DOUBLE HEADERS.— When two or more locomotives are coupled in the same train the brakes must be connected through to and operated from the head engine. For this purpose a cock is placed in the train pipe just below the engineer's valve. The engineer of each locomotive, except the head one, must close this cock and place the handle of the engineer's valve in position 2. He will start his air pump and let it run, as though he were going to use the brake, for the purpose of maintaining air

THE PLAIN AUTOMATIC TRIPLE VALVE.

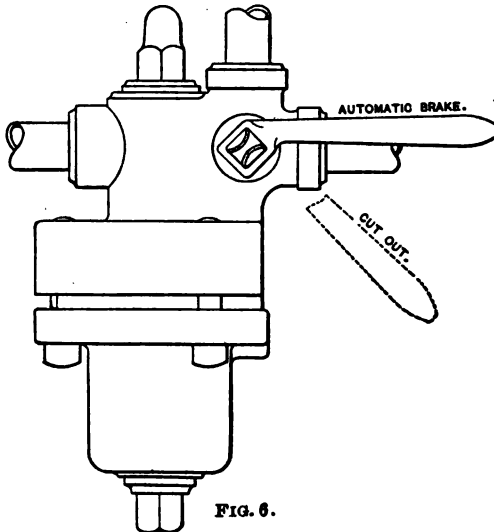


FIG. 6.

pressure on his locomotive and enabling him to assume charge of the train brakes should occasion require it.

AN EXTRA AIR-BRAKE HOSE COMPLETE must always be carried on the locomotive for repairs in case of a burst hose. Upon locomotives having the air signal a signal hose complete must also be carried for the same purpose.

INSTRUCTIONS TO TRAINMEN.

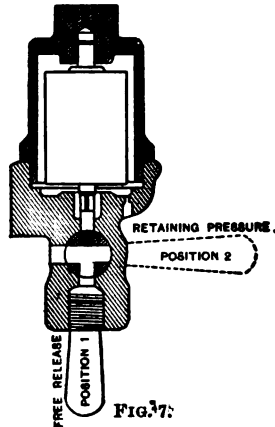
MAKING UP TRAINS AND TESTING BRAKES.—When the locomotive has been coupled to the train, or when two sections have been coupled together, the brake and signal couplings must be united, the cocks in the train pipes — both brake and signal — must all be open, except those at the rear end of the last car, which must be closed, and the hose hung up properly in the dummy coupling, when cars are so equipped.

After the engineer has charged the train with air he must then be signaled to apply the brakes, as provided for in the train rules. When he has done so the brakes

of each car must be examined to see if they are properly applied. When it is ascertained that each brake is applied the engineer must be signaled to release the brakes. When the train air signal is to be used the signal to the engineer to release the brakes must be given by means of the air signal from the rear car of the train. The brakes of each car must then be examined to see that each is released.

If any defect is discovered it must be remedied and the brakes tested again—the operation being repeated until it is ascertained that everything is right. The conductor and engineer must then be notified that the brakes are all right. This examination must be made every time any change is made in the make-up of the train and before starting down such grades as may be designated by special instructions. At points where there are no inspectors trainmen must carry out these instructions. No passenger train must be started out from an inspection point with the

THE PRESSURE RETAINING VALVE.



brakes upon any car cut out or in a defective condition without special orders from the proper officers. The air brakes must not be alone relied upon to control any freight train with a smaller proportion of cars with the air brake in service than provided for by special instructions. When hand brakes are also used they must be applied upon those cars next behind the air-braked cars.

DETACHING LOCOMOTIVE OR CARS.—First close the cocks in the train pipes at the point of separation, and then part the couplings, invariably by hand.

COUPLINGS FROZEN.—If the couplings are found to be frozen together or covered with an accumulation of ice, the ice must first be removed and then the couplings thawed out by a torch to prevent injury to the gaskets.

BRAKES STICKING.—If brakes are found sticking, the engineer must be signaled "brakes sticking," as provided for by special rules. If the engineer cannot release the brakes, or if the brakes are applied to detached cars, the release may

be effected by opening the bleed cock in the auxiliary reservoir until the air begins to release through the triple valve, when the reservoir cock must immediately be closed.

TRAIN BREAKING INTO TWO OR MORE PARTS.—First close the cock in the train pipe at the rear of the first section and signal the engineer to release the brakes. Having coupled to the second section, observe the rule for making up trains — first being sure that the cock in the train pipe at the rear of the second section has been closed, if the train has broken into more than two sections. When the engineer has released the brakes on the second section the same method must be employed with reference to the third section, and so on. When the train has been once more entirely united the brakes must be inspected on each car to see that each is released before proceeding.

CUTTING OUT THE BRAKE ON A CAR.—If, through any defect of the brake apparatus while on the road, it becomes necessary to cut out the brake upon any car, it may be done by closing the cock in the cross-over pipe near the center of the car where the quick-acting brake is used, or by turning the handle of the cock in the triple valve to a position midway between a horizontal and vertical where the plain automatic brake is used, first releasing the brake. When the brake has been thus cut out, the cock in the auxiliary reservoir must be opened and left open upon passenger cars, or held open until all the air has escaped from the reservoir upon freight cars. **THE BRAKE MUST NEVER BE CUT OUT UPON ANY CAR UNLESS THE APPARATUS IS DEFECTIVE**, and when it is necessary to cut out a brake the conductor must notify the engineer and also send in a report stating the reasons for so doing.

CONDUCTOR'S VALVE.—Should it become necessary to apply the brakes from the train, it may be done by opening the conductor's valve, placed in each passenger equipment car. **THE VALVE MUST BE HELD OPEN UNTIL THE TRAIN COMES TO A FULL STOP, AND THEN MUST BE CLOSED AGAIN.**

This method of stopping the train must not be used except in case of emergency.

BURST HOSE.—In the event of the bursting of a brake hose, it must be replaced and the brakes tested before proceeding, provided the train be in a safe place. If it is not, the train pipe cock immediately in front of the burst hose must be closed, and the engineer signaled to release. All the brakes to the rear of the burst hose must then be released by hand, and the train must then proceed to a safe place where the burst hose must be replaced and the brakes again connected and tested as in making up a train. One extra air brake hose complete should be carried by all crews and one extra signal hose complete carried by passenger crews for repairs.

BRAKES NOT IN USE.—When the air brakes are not in use, either upon the road or in switching, the hose must be kept coupled between the cars or hung up properly to the dummy couplings, when cars are so equipped.

PRESSURE-RETAINING VALVE.—When this valve is to be used, the trainmen must, at the top of the grade, test the brakes upon the whole train, and must then pass over the train and turn the handles of the pressure-retaining valves horizontally (position 2) upon all or a part of the cars, as may be directed. At the foot of the grade, the handles must all be turned downward again (position 1). Special instructions will be issued as to the grades upon which these valves are to be used.

TRAIN AIR SIGNAL.—In making up trains, all couplings and car discharge

valves on the cars must be examined to see if they are tight. Should the car discharge valve upon any car be found to be defective while on the road, it may be cut out of use upon that car by closing the cock in the branch pipe leading to the valve. The conductor must always be immediately notified when the signal has been cut out upon any car, and he must report the same for repairs.

In using the signal, pull directly down upon the cord during one full second, for each intended blast of the signal whistle, and allow two seconds to elapse between the pulls.

REPORTING DEFECTS TO INSPECTORS.—Any defect in either the air brake or air signal apparatus discovered upon the road must be reported to the inspector at the end of the run; or, if the defect be a serious one in passenger service, it must be reported to the nearest inspector, and it must be remedied before the car is again placed in service.

INSTRUCTIONS TO ENGINE-HOUSE FOREMEN.

GENERAL.—It is the duty of engine-house foremen to see that the air brake and signal equipment is properly inspected upon each locomotive after each run. It must be ascertained that all pipe joints, connections and all other parts of the apparatus are air tight, duplex gauges tested every thirty days, and that the apparatus is in good working order.

AIR PUMP.—The air pump must be tested under pressure, and if found to be working imperfectly in any respect, it must be put into thoroughly serviceable condition.

PUMP GOVERNOR.—The pump governor should cut off the steam supply to the pump, when the train pipe pressure has reached seventy (70) pounds, with D 8 brake valve, and at 90 pounds main reservoir pressure with E 6 or F 6 valve. If it does not, it must be regulated to do so.

ENGINEER'S BRAKE VALVE.—This valve must be kept clean and in perfect order. With the handle in position 2, the main reservoir pressure must not be less than twenty pounds greater than train pipe pressure. The valve must be tested with the handle in positions 4 and 3, to note that the equalizing piston responds promptly, and that there are no leaks from port to port under the rotary disk valve.

ADJUSTMENT OF BRAKES.—The driver brakes must be so adjusted that the pistons travel not less than one-third nor more than two-thirds of their stroke. When the cam brake is used care must be taken to adjust both cams alike, so that the point of contact of the cams shall be in line with the piston rod. The tender brake must be adjusted by means of the dead truck levers, so that the piston travels not less than six inches when the air brake is applied and the hand brake is released. This adjustment must be made whenever the piston travel is found to exceed nine inches.

BRAKE CYLINDERS AND TRIPLE VALVES.—These must be examined and cleaned once every six months, and the cylinders oiled once in three months. If the driver brake cylinders are in a position to be affected by the heat of the boiler, they must be oiled more frequently. A record must be kept of the dates of last cleaning and oiling for each locomotive.

DRAINING.—The main reservoir, and also the drain cup in the train pipe under the tender must be drained of any accumulation after each trip. The auxiliary reservoirs and triple valves must also be drained frequently, and daily in cold weather, and the train pipe under the engine and tender blown out.

AIR SIGNAL.—The train air signal apparatus must be examined and tested by suitable appliances from both the head of the engine and the rear of the tender, to know that the whistle responds properly. A pressure gauge must be applied to the air signal pipe, once each month, to ascertain that the reducing valve maintains the proper pressure of forty pounds per square inch in the train signal pipe.

INSTRUCTIONS TO INSPECTORS.

GENERAL.—It is the duty of all inspectors to see that the couplings, the pipe joints, the triple valves, the conductor's valves, the air signal valves, and all other parts of the brake and signal apparatus are in good order and free from leaks. For this purpose they must be tested under the full air pressure as used in service. No passenger train must be allowed to leave a terminal station with the brake upon any car cut out, or in a defective condition, without special orders from the proper officer.

If a defect is discovered in the brake apparatus of a freight car, which cannot be held long enough to give time to correct such defect, the brake must be cut out and the car properly carded, to call the attention of the next inspector to the repairs required.

Special rules will specify the smallest proportion of freight cars, with the air brakes in good condition, which may be used in operating the train as an air brake train.

MAKING UP TRAINS AND TESTING BRAKES.—In making up trains, the couplings must be united and the cocks at the ends of the cars all opened, except at the rear end of the last car, where the cocks must be closed, the inspector must know that the air is passing through the pipes to the rear end, and the couplings properly hung up to the dummy couplings, if so equipped. After the train is fully charged, the engineer must be signaled to apply the brakes. When the brakes have been applied, they must be examined upon each car to see that they are applied with proper piston travel. This having been ascertained, the inspector must signal the engineer to release the brakes, using the train air signal from the rear car, upon passenger trains. He must then again examine the brakes upon each car to note that each is released. If any defect is discovered, it must be corrected and the testing of the brakes repeated, until they are found to work properly. The inspector must then inform both the engineer and conductor of the number of cars with brakes in good order.

This examination must be repeated if any change is made in the make-up of the train before starting.

CLEANING CYLINDERS AND TRIPLE VALVES.—The brake cylinders and triple valves must be kept clean and free from gum. They must be cleaned and oiled as often as once in six months, upon passenger cars, and once in twelve months upon freight cars. The dates of last cleaning and oiling must be marked with white paint upon the cylinder in the places left for such dates opposite the words, which will be

stenciled with white paint, in one-inch letters, upon the cylinder or reservoir as follows:

Cylinder cleaned and oiled
Triple cleaned and oiled

The triple valves and auxiliary reservoirs must be frequently drained, especially in cold weather, by removing the plug in the bottom of the triple valve and opening the bleed cock in the reservoir.

GRADUATING SPRINGS.—The graduating springs in the Westinghouse quick-action freight triple valves are No. 15 B. W. G. brass wire, 14 coils, 3 inches free height after taking permanent set; and in passenger No. 14 B. W. G., 12 coils, 2½ inches free height after receiving permanent set.

ADJUSTMENT OF BRAKES.—The slack of the brake shoes must be taken up by means of the dead truck levers.

In taking up such slack, it must be first ascertained that the hand brakes are off, and the slack is all taken out of the upper connections, so that the truck levers do not go back within 1 inch of the truck timber or other stop, when the piston of the brake cylinder is fully back at the release position. When, under a full application, the brake piston travel is found to exceed nine inches upon passenger or freight cars, the brake shoe slack must be taken up and the adjustment so made that the piston shall travel not less than six inches. In taking up the brake shoe slack it must never be taken up by hand brakes.

BRAKING POWER.—Where the cylinder lever has more than one hole at the outer end the different holes are for use upon cars of different weights.

It must be carefully ascertained that the rods are connected to the proper holes, so that the correct braking power shall be exerted upon each car.

REPAIR PARTS.—Inspectors must keep constantly on hand for repairs a supply of all parts of the brake and signal equipment that are liable to get out of order.

HANGING UP HOSE.—Inspectors must see that, when cars are being switched or standing in the yard, the hose is coupled between the cars or properly secured in the dummy coupling, when cars are so equipped.

RESPONSIBILITY OF INSPECTORS.—Inspectors will be held strictly responsible for the good condition of all the brake and signal apparatus upon cars placed in trains at their stations; they will also make any examination of brake apparatus or repairs to the same, which they may be called upon to do by trainmen.

GENERAL QUESTIONS
REGARDING THE USE OF THE
AIR BRAKE AND TRAIN SIGNAL.

GENERAL QUESTIONS.

(All parties who have to do with the use, adjustment, care or repairs of air brakes should be thoroughly examined on these questions, in addition to the special questions for each class of men following them.)

1. Question. What is an air brake ?

Answer. It is a brake applied by compressed air.

2. Q. How is the air compressed ?

A. By an air pump on the locomotive.

3. Q. How does the compressed air apply the brakes ?

A. It is admitted into a brake cylinder on each car, and it pushes out a piston in that cylinder which pulls the brake on.

4. Q. How does the piston get back when the brakes are released ?

A. There is a spring around the piston rod which is compressed when the brakes are applied, and when the air is allowed to escape to release the brakes, this spring reacts and pushes the piston in again.

5. Q. Where is the compressed air kept ready for use in the automatic air brake ?

A. In the main reservoir on the locomotive, in the smaller or auxiliary reservoir on each car, and in the train pipe.

6. Q. Where does the compressed air come from directly, that enters the brake cylinder when the automatic brake is applied ?

A. It comes from the auxiliary reservoir on each car in service application, and from the auxiliary reservoir and train pipe in emergency application.

7. Q. How does it get into the auxiliary reservoir ?

A. It is furnished from the main reservoir on the locomotive through the train pipe and triple valve when the brakes are released.

8. Q. How is the automatic brake applied and released ?

A. The automatic brake is applied by reducing the air pressure in the train pipe below that in the auxiliary reservoir, and is released by raising the train pipe pressure above that remaining in the auxiliary reservoir.

9. Q. Why does the compressed air not enter directly into the brake cylinder from the train pipe ?

A. Because the triple valve used with the automatic brake prevents the air from entering directly from the train pipe to the brake cylinder when the pressure in the train pipe is maintained or increased.

10. Q. What other uses has the triple valve ?

A. It causes the brake cylinder to be opened to the atmosphere under each car, to release the brakes when the pressure in the train pipe is made greater than that

in the auxiliary reservoir, and it opens communication from the train pipe to the auxiliary reservoir by the same movement; when the pressure in the train pipe is reduced, it closes the openings from the train pipe to the auxiliary reservoir and from the brake cylinder to the atmosphere, and then opens the passage between the auxiliary reservoir and the brake cylinder by the same movement, so as to admit the air and apply the brakes.

11. Q. How many forms of triple valves are there in use, and what are they called?

A. Two: the plain triple and the quick-acting triple.

12. Q. How can you tell the plain triple from the quick-acting triple?

A. The plain triple has a four-way cock in it, with a handle for operating the cock; the quick-acting triple has no such cock in it, but there is a plug cock in the cross-over pipe leading from the train pipe to the triple, when the quick-acting triple is used.

13. Q. What are these cocks for in both cases?

A. They are to be used to cut out brakes on one car, without interfering with other brakes on the train, if the brake on that car has become disabled.

14. Q. How does the cock handle stand in the plain triple valve when the pipe is open for automatic action?

A. It stands in a horizontal position.

15. Q. In what position does the same handle stand when the brakes are cut out by closing the cock?

A. It stands at an inclined position midway between horizontal and vertical.

16. Q. How does the handle of the plug cock in the cross-over pipe, used with the quick-acting triple, stand for automatic action?

A. It stands with the handle crosswise with the pipe, and the cock is then open.

17. Q. How does it stand when the cock is closed and the brake cut out of action?

A. It stands with handle lengthwise of cross-over pipe.

18. Q. How is the train pipe coupled up between the cars?

A. By means of a rubber hose on each end of the train pipe, fitted with a coupling at the loose end.

19. Q. How is the train pipe closed at the rear end of the train?

A. By closing the cock in the train pipe at the rear end of the last car.

20. Q. How many such train pipe cocks are there to a car, on the air brake train pipe and on the air signal train pipe, and why?

A. Two for each pipe on each car, because either end of any car may sometimes be at the rear end of the train.

21. Q. How many kinds of train pipe cocks are there in use at the ends of the cars?

A. Two.

22. Q. Describe each and give the position of the handles for open and closed in each case?

A. The older form of train pipe cock is a straight plug cock in the train pipe, not far from the hose connection; the handle stands crosswise with the pipe when it is open, and lengthwise with the pipe when closed; it is now found principally on the air signal pipe. The other form of train pipe cock now used on the air-brake

pipe is an angle cock placed at the end of the train pipe and close to the hose. The handle of the angle cock stands lengthwise with the pipe when open, and crosswise with the pipe when closed.

23. Q. What uses have these train pipe cocks besides to close the pipe at the rear end of the train?

A. They are to be used to close the train pipe at both sides of any hose coupling which is to be parted, as when the train is cut in two.

24. Q. Why is it necessary to close the train pipe on both sides of the hose coupling before it is parted?

A. To prevent the escape of air from the train pipe which would apply the brakes.

25. Q. How must the hose coupling be parted when it is necessary to do so, and why?

A. The air brake must first be released on the train from the engine, then the adjacent train pipe cocks must both be closed and the coupling must be parted by hand, to prevent the possibility of injury to the rubber gasket in the coupling.

26. Q. Why must the brakes be fully released before uncoupling the hose between the cars?

A. Because if the brakes are applied upon a detached car, they cannot be released without bleeding the auxiliary reservoir, and thus wasting air.

27. Q. In coupling or uncoupling the hose between cars, what must be done if there is ice on the couplings?

A. The ice must first be removed and the couplings thawed out, so as to prevent injury to the rubber gaskets in uncoupling, and to insure tight joints in coupling the hose.

28. Q. What must be done with a hose coupling which is not coupled up, such as the rear hose of a train, or any hose on a car which is standing or running, but not in use?

A. It must be placed in the dummy coupling if provided for in such manner that the flat pad on the dummy will close the opening in the coupling.

29. Q. What pressure should be carried in the train pipe and auxiliary reservoir?

A. Seventy pounds pressure to the square inch.

30. Q. Why should this pressure be 70 pounds?

A. Because this pressure is necessary, to get the full braking force which each car is capable of using, and, if it be exceeded, there will be danger of sliding the wheels.

31. Q. How much pressure can be obtained in the brake cylinder by the service application of the brakes with 70 pounds in the auxiliary reservoir.

A. About 50 pounds pressure to the square inch, with an eight-inch piston travel.

32. Q. Why can only 50 pounds pressure be obtained under these circumstances?

A. Because the air, at 70 pounds pressure in the auxiliary reservoir, expands into an additional space when the auxiliary reservoir is opened to the brake cylinder, and, when the pressure has become equalized, it is thus reduced to 50 pounds.

33. Q. How much must the train pipe pressure be reduced, in order to get 50 pounds pressure in the brake cylinder, in ordinary service?

A. Twenty pounds; or from 70 pounds down to 50 pounds in the train pipe also.

34. Q. Can the brakes be applied so as to get only a portion of this 50 pounds pressure in the brake cylinder, and how?

A. They can be so applied by reducing the train pipe pressure less than 20 pounds.

35. Q. If the train pipe pressure be reduced 10 pounds what will the pressure be in the brake cylinder?

A. About 25 pounds.

36. Q. How is this graduated action obtained?

A. By means of the graduating valve in the triple valve.

37. Q. Is it important to keep all the air-brake apparatus tight and free from leaks?

A. Yes.

38. Q. Why is this important?

A. In order to get full service from the air brakes, and to prevent the waste of air, and also to prevent the brakes applying automatically by reason of leak in the train pipe.

39. Q. Is it important to know that the train pipe is open throughout the train and closed at the rear end before starting out?

A. Yes; this is very important.

40. Q. Why is this very important?

A. Because if any cock in the train pipe were closed, all the brakes back of the cock which is closed would be prevented from working.

41. Q. How can you know that the train pipe cocks are all open when the train is made up?

A. By testing the brakes; that is, by applying and releasing them, and observing whether they all operate.

42. Q. Do you understand that no excuse will be acceptable for starting out the train without first testing the air brakes?

A. Yes.

43. Q. Why is this rule absolute?

A. Because the safety of passengers and of property depends upon the brakes being properly coupled up and in an operating condition before the train is started.

44. Q. At what other times should the brakes be tested, and how?

A. After each change in the make-up of the train and before starting the train down certain designated grades, and the test should be made with a full service application of the brakes.

45. Q. From where does the air signal apparatus receive its pressure?

A. From the main air reservoir through the reducing valve.

46. Q. How much air pressure should be carried in the air-signal train pipe?

A. Forty pounds pressure.

47. Q. Is it important that this train pipe and its connections be also kept tight?

A. Yes.

48. Q. After taking up the slack of the brake shoes, how far should the brake piston travel in the cylinders on cars and tenders with a full application of the brake?

A. Not less than 6 inches.

49. Q. What would happen if the piston traveled less than 6 inches when brakes are fully applied?

A. A partial application of the brakes might not close the leakage groove in the brake cylinder provided for the escape of small amounts of air.

50. Q. Why should the piston travel not be permitted to exceed nine inches on passenger cars, tenders, or freight cars?

A. Because, if it travels farther than this when sent out, a little wear of the brake shoes will cause the piston to travel far enough to rest against the back cylinder head when the brakes are applied, and this cylinder head would then take the pressure instead of its being brought upon the brake shoes.

51. Q. How far should the driver brake piston travel with a full application of the brakes, and why?

A. Not less than one-third of the full stroke of the piston nor more than two-thirds of its full stroke, for reasons similar to those given for cars and tenders.

52. Q. If the brakes stick upon any car so that the engineman cannot release them at any time, how should they be released?

A. By opening the release cock in the auxiliary reservoir and holding it open until air begins to escape from the triple valve and then closing it again.

53. Q. What is the pressure-retaining valve, and what is its use?

A. The pressure-retaining valve is a small valve placed at the end of a pipe from the triple valve, through which the exhaust takes place from the brake cylinder. It is used to retard the brake release on heavy grades, and hold the brakes partially applied, so as to allow more time for the engineman to recharge the auxiliary reservoir.

54. Q. What precautions are necessary on every train in regard to hose couplings?

A. Every train must carry at least two extra hose and couplings complete, for use in replacing any hose couplings which may fail or become disabled. These extra hose and couplings to be carried on such part of the train as is required by the rules and regulations.

SPECIAL FOR ENGINEMEN.

55. Q. How should the air pump be started?

A. It should be started slowly, so as to allow the condensation to escape from the steam cylinder and prevent pounding, which is more likely to occur when the air pressure is low.

56. Q. Why should the piston rod on the air pump be kept thoroughly packed?

A. To prevent the waste of air and steam.

57. Q. How should the steam cylinder of the air pump be oiled, and what kind of oil should be used?

A. It should be oiled as little as necessary through a sight feed lubricator, and cylinder oil should be used.

58 Q How should the air cylinder of the air pump be oiled; what kind of oil, and why?

A. It should be oiled very little by once filling the oil-cup with a good quality of well oil daily. Cylinder oil, lard oil and other animal or vegetable oils should not be used, as their use causes the engineer's brake valve and the triple valves to gum up. The oil must never be introduced through the air inlet ports, as this practice would cause the pump valves to gum up.

59 Q What regulates the train pipe pressure?

A. The pump governor, with D 8 valve, and the feed valve attachment with the E 6 or F 6 valve.

60 Q Why should the train pipe pressure not exceed 70 pounds?

A. Because 70 pounds train pipe pressure produces the strongest safe pressure of the brake shoes upon the wheels. A higher train pipe pressure is liable to cause the wheels to slide.

61 Q Why is an equalizing engineer's valve better than the older forms?

A. Because it enables the engineer to apply the brakes more uniformly throughout the train, and with less shock to the train, especially when the quick-acting triple valves are used. It also prevents the brakes from being kicked off on the forward end of the train when the engineer closes the valve after applying the brakes.

62 Q Why does an equalizing engineer's valve produce these results in ordinary service stops?

A. Because the engineer does not, in such cases, open the train pipe to the atmosphere direct, but he only reduces the air pressure above the piston in the engineer's valve, which causes that piston to open the train pipe to the atmosphere, and to close the opening gradually when the train pipe pressure has been correspondingly reduced.

63 Q What does the excess pressure valve in the D 8 brake valve accomplish, and do you regard it important to have it working properly?

A. It maintains an excess pressure in the main reservoir above the pressure in the train pipe, and it is important that it be kept clean and in working order so as to have this excess pressure to insure release, and for use in recharging the train quickly after the brakes are released.

64 Q What does the feed valve attachment of the E 6 or F 6 engineer's valve accomplish?

A. When properly adjusted it restricts the train pipe pressure to a maximum of 70 pounds with the engineer's valve in running position. When this valve is used, the pump governor is attached to main reservoir pressure and may be set to carry whatever pressure is desired therein.

65 Q How often should the brake valve be thoroughly cleaned and oiled?

A. At least once every two months.

66 Q If the rotary disk valve in the engineer's valve is unseated by dirt or by wear, what may be the result, and what should be done?

A. It may be impossible to get the excess pressure; when the brakes have been applied they may keep applying harder until full on, or when they have been applied they may go off. The rotary disk valve should be thoroughly cleaned, and if worn it should be faced and ground to a seat.

67. Q. If the piston in the engineer's valve becomes gummed up or corroded from neglect to clean it, what will be the result?

A. It will be necessary to make a large reduction of pressure through the preliminary exhaust port before the brakes will apply at all, and then the brakes will go on too hard, and will have to be released.

68. Q. When the locomotive is standing alone and the pump is running, why must the D 8 engineer's valve not be left standing in the lap position (No. 3)?

A. Because the main reservoir pressure may become so high that, when the handle of the engineer's valve is again placed in the release position, it will cause the train pipe and tender auxiliary reservoir to be charged with too high pressure, which might injure the adjustment of the pump governor as well as cause the tender wheels to be slid with the first application of the brakes.

69. Q. How and why should the train pipe under the tender always be blown out thoroughly before connecting up to the train?

A. By opening the angle cock at the rear end of the tender and allowing the air from the main reservoir to blow through. This blows out the oil, water, scale, etc., which may accumulate in the pipe, and which would be blown back into the train pipe and triple valves if not removed before coupling to the train.

70. Q. When the engine is coupled to the train, why is it necessary to have 90 pounds or more pressure in the main reservoir?

A. So that the brakes will all be released and the train quickly charged when the engineer's valve is placed in the release position.

71. Q. Why should the driver brakes always be operated automatically with the train brake?

A. Because it adds greatly to the braking force of the train, and the brakes can be applied alike to all the wheels for ordinary stops, and in an emergency the greatest possible braking force is at once obtained by one movement of the handle.

72. Q. In making a service application of the brakes, how much reduction of the train pipe pressure from 70 pounds does it require to get the brakes full on?

A. About 25 pounds reduction.

73. Q. What should the first reduction be in such an application, and why?

A. From five to seven pounds, so as to insure moving the pistons in the brake cylinders past the leakage groove, yet not apply the brakes too hard, until the slack in drawbars and drawsprings is first taken up.

74. Q. What is the result of making a greater reduction of pressure than 25 pounds?

A. A waste of air in the train pipe, without getting any more braking force, and therefore requiring more air to release the brakes.

75. Q. How many applications of the brakes are necessary in making a stop?

A. Generally only one; by applying them lightly at first with five to seven pounds reduction of air in the train pipe, and afterward gradually increasing the force of the application. Two applications are as many as should ever be required.

76. Q. Why is it dangerous to apply and release the brakes repeatedly in making stops?

A. Because every time the brakes are released the air in the brake cylinders is thrown away, and if it is necessary to apply them again before sufficient time has elapsed to recharge the auxiliary reservoirs the application of the brakes will be weak,

and after a few such applications the brakes are almost useless on account of the air having been exhausted from the auxiliary reservoirs.

77. Q. In releasing and recharging the train, how long should the handle of the engineer's valve be left in the release position?

A. Until the train pipe pressure has risen nearly to 70 pounds again.

78. Q. In making service stops with passenger trains, why should you release the brakes a little before coming to a full stop?

A. So as to prevent stopping with a lurch; it also requires less time for the full release of the brakes after stopping.

79. Q. In making stops with freight trains, why should the brakes not be released until after the train has come to a full stop?

A. Because long freight trains are apt to be parted by releasing the brakes at low speed.

80. Q. In making service stops, why must the handle of the engineer's valve not be moved past the position for service applications?

A. So as to prevent unnecessary jerks to the train, and the emergency action of the triple valve when not necessary.

81. Q. If you find the train dragging from the failure of the brakes to release, how can you release them?

A. By placing the handle on the engineer's valve in full release position, No. 1, for a few seconds, and returning it to the running position, No. 2.

82. Q. When the brakes go on suddenly when not operated by the engineer's valve, and the gauge pointer falls back, what is the cause, and what should you do?

A. Either a hose has burst, or a conductor's valve has been opened, or the train has parted. In any event, the handle of the engineer's valve must be immediately placed in the lap position to prevent the escape of air from the reservoir.

83. Q. Are the brakes liable to stick on after an emergency application, and why?

A. The brakes are harder to release after a severe application, because they are on with full force, and it requires higher pressure than usual in the train pipe to release them again. In this case it is necessary always to have in reserve the excess pressure on the main reservoir to aid in releasing the brakes. With the quick-acting triple valve this is especially necessary, because air from the train pipe as well as from the auxiliary reservoir is forced into the brake cylinder when a quick application of the brake is made, thus increasing the pressure in the brake cylinder without the usual reduction of pressure in the auxiliary reservoir, and requiring a high pressure in the train pipe afterward to cause the brakes to be released.

84. Q. In using the brakes to steady the train while descending grades, why should the air pump throttle be kept well open?

A. So that the pump may quickly accumulate a full pressure in the main reservoir for use in recharging the train when the brakes have been released again.

85. Q. In descending a grade how can you best keep the train under control?

A. First, by commencing the application of the brakes early, so as to prevent too high a speed being reached. Second, by applying the brakes lightly at first, then increasing the brake pressure as needed, and by slowing the train down just before it is necessary to release the brakes for recharging, so as to give time enough to refill the auxiliary reservoirs before much speed is again attained.

86. Q. If the train is being drawn by two or more locomotives, upon which engine should the brakes be controlled, and what must the enginemen of the other locomotive do?

A. The brakes must be controlled by the leading locomotive, and the enginemen of the following locomotives must close the cock in the train pipe just below the engineer's valves. The latter must always keep his pump running and in order, and main reservoir charged, with the engineer's valve in the running position, so that he may quickly operate the brakes if called upon to do so.

87. Q. If the air signal whistle only gives a weak blast, what is the probable cause?

A. Either the reducing valve is out of order so that the pressure is less than 40 pounds or the whistle itself is filled with dirt or not properly adjusted or the port under the end of signal valve is partially closed by gum or dirt.

88. Q. If the reducing valve for the air signal is allowed to become clogged up with dirt, what will the result probably be?

A. The signal pipe might get the full main reservoir pressure, and the whistle will blow when the brakes are released.

89. Q. If you discover any defect in the air brake or signal apparatus while on the road, what must be done?

A. If it is something that cannot be readily remedied at once, it must be reported to the engine-house foreman as soon as the run is completed.

90. Q. What is the result if water be allowed to collect in the main reservoir of the brake apparatus?

A. The room taken up by the water reduces the capacity for holding air, and the brakes are more liable to stick. In cold weather also the water may freeze and prevent the brakes from working properly.

SPECIAL FOR ENGINE REPAIRMEN.

91. Q. How often must the air brake and signal apparatus on locomotive be examined?

A. After each trip.

92. Q. Under what pressure must it be examined?

A. Under full pressure, i. e., 70 pounds on the air brake train pipe, 20 pounds excess in the main reservoir, and 40 pounds pressure upon the air signal train pipe.

93. Q. How will you be sure that proper pressures are upon the two train pipes?

A. By regulating, and, if necessary, cleaning the pump governor so that it will shut off steam from the pump when 70 pounds train pipe pressure is reached, and by examining, and, if necessary, cleaning the pressure reducing valve for the signal train pipe, so that it maintains 40 pounds pressure in the train pipe.

94. Q. If you do not obtain 20 pounds excess pressure in the main reservoir when the handle of the D 8 engineer's valve is in the running position, what is the cause?

A. Either the excess pressure valve needs cleaning, or the rotary disk valve in the engineer's valve is unseated and allows air to leak from one port to another.

95. Q. Should the train pipe pressure exceed the maximum of 70 pounds, where would you look for the cause of the trouble in the Westinghouse F 6 brake valve?

A. Either the supply valve needs cleaning, the rotary disk valve is unseated, or the gasket between the main reservoir connection and chamber D is defective; or the feed valve attachment case gasket is defective; or the regulating spring below the piston needs adjusting.

96. Q. Why must the air pump piston rod be kept well packed?

A. To prevent leakage of steam and air.

97. Q. How often must the main reservoir and the drain cup under the tender be drained?

A. After each trip.

98. Q. How often must the triple valves and the cylinders of the driver and tender brakes be cleaned and oiled?

A. They must be thoroughly cleaned and oiled with a small amount of mineral oil once every six months, and the cylinders must be oiled every three months. If the driving brake cylinders are so located that they become hot from the boiler, they may require oiling more frequently.

99. Q. If there are any leaks in the pipe joints or anywhere in the apparatus, what must you do?

A. Repair them before the locomotive goes out.

100. Q. How is the brake shoe slack of the cam driver brake taken up, and what precautions are necessary?

A. By means of the cam screws, and it is necessary to lengthen both alike, so that when the brake is applied the point of contact of the cams will be in a line with the piston rod.

101. Q. How is the brake shoe slack of driver brakes on a locomotive with more than two pairs of driving wheels taken up?

A. By means of a turn-buckle or screw in the connecting rods.

102. Q. How is the slack of the tender brake shoes taken up?

A. By means of the dead truck levers; if they will not take it up enough, it must be taken up in the underneath connection, and then adjusted by the dead lever.

103. Q. How far should the driver brake piston travel in applying the brakes?

A. Not less than one-third nor more than two-thirds of the full stroke of the piston.

104. Q. What travel of piston should the tender brakes be adjusted for?

A. Not less than five inches nor more than six inches, and such adjustment must be made whenever the piston travel is found to exceed eight inches.

SPECIAL FOR TRAINMEN.

105. Q. How should you proceed to test the air brakes before starting out, after a change in the make-up of a train, or before descending certain specially designated grades?

A. After the train has been fully charged with air, the engineman must be signaled to apply the brakes; when he has done so, the brakes must be examined upon

each car to see that the air is applied and that the piston travel is not less than five inches nor more than eight inches, on a passenger car, or nine inches on a freight car. The engineman must be then signaled to release the brakes, and this signal must be given by the train air signal from the rear car, if it is in use upon the train; after he has done so, each brake must be examined again to see that all are released. The engineman and conductor must then be notified that the brakes are all right, if they are found so.

106. Q. In starting out a passenger train from an inspection point, how many cars must have the brakes in service?

A. Every car upon the train.

107. Q. When might you cut out a brake upon a passenger car?

A. Never; unless it gets out of order while on the run, in which case it must be reported to the inspector at the end of the run, or upon the first opportunity which may give sufficient time to repair it.

108. Q. If a hose bursts upon the run what must be done, if the train is in a safe place?

A. The hose must first be replaced by a good one, and the engineman then signaled to release the brakes. The train must not proceed until the brakes have been reconnected and tested upon the train to see that all are working properly.

109. Q. If the train is not in a safe place when the hose bursts, what must be done?

A. The train pipe cock immediately ahead of the burst hose must be closed and the engineer signaled to release the brakes. The brakes at the rear of the burst hose must then be released by bleeding the auxiliary reservoirs, and the train must then proceed to a safe place to replace the hose and connect up the brakes, after which the brakes must be tested.

110. Q. If the train breaks in two, what must be done?

A. The cock in the train pipe at the rear end of the first section must be closed, and the engineman signaled to release the brakes. The two parts of the train must then be coupled, the hose connected and the brakes again released by the engineman. When it is ascertained that the brakes are all released, the train may proceed.

111. Q. Explain how the pressure-retaining valves are thrown into action or thrown out of action, and when this must be done.

A. The pressure-retaining valve is thrown into action by turning the handle of the valve to a horizontal position, and it is thrown out of action again by placing this handle in a vertical position pointing downward. This handle should be placed in a horizontal position at the top of a heavy grade, and it should always be returned to a vertical position at the foot of the grade, as otherwise the brakes will drag on any cars which still have the handle of the pressure-retaining valve in the horizontal position.

112. Q. If the brake of any car is found to be defective on the run, how should you proceed to cut it out?

A. By closing the cock in the cross-over pipe of the quick-acting brake, or in the triple valve of the plain automatic brake, and then opening the release cock in the auxiliary reservoir upon that car, leaving it open, if a passenger car, or holding it open until all the air has escaped from it, if a freight car.

113. Q. When it is necessary to cut out a defective brake upon a car, why should it always be cut out at the triple valve and never by the train pipe cock at the end of the car, even if it is the last car of the train?

A. The train pipe should always be open from the locomotive to the rear end of the last car, so that if the train breaks in two the brakes will be automatically applied before the parts of the train have separated sufficiently to permit damage to be done by their coming together again, and so that the brakes may be applied with the conductor's valve upon any car.

114. Q. Should the train pipe burst under any car, what must be done?

A. The train must proceed to the nearest switching point, using the brakes upon the cars ahead of the one with the burst pipe, where the car with the burst pipe must be switched to the rear of the train; the hose must then be coupled up to the rear car and the cock at the rear end of the next to the last car opened and the cock at the forward end of the last car closed, so that if the train should part between the last two cars the brakes will be applied.

115. Q. What is the conductor's valve, and what is its use?

A. It is a valve at the end of the branch pipe leading from the train brake pipe upon each passenger car; it is to be opened from the car in any emergency when it is necessary to stop the train quickly, and only then. When used it should be held open until the train is stopped, and then it should be closed.

116. Q. What is the air signal for, and how is it operated?

A. It is to signal the engineman, in place of the old gong signal, and it is operated by pulling directly downward on the cord, and releasing immediately, allowing two full seconds to elapse between pulls.

117. Q. If the car discharge valve on the air signal system is out of order or leaking on any car, how can you cut it out?

A. By closing the cock in the branch pipe leading from the train signal pipe to the discharge valve; to do so the handle of this cock should be placed lengthwise with the pipe.

118. Q. How is the slack taken up so as to secure the proper adjustment of piston travel?

A. By means of the dead truck lever, and if that is not sufficient, one or more holes must be taken up in the underneath connection and the adjustment then made by the dead truck lever.

SPECIAL FOR INSPECTORS.

119. Q. Do you understand that no passenger train may be started out with any of the brakes cut out of service?

A. I do.

120. Q. Why is it important that no leaks should exist in the air brake service?

A. Because they would interfere with the proper working of the brakes and might cause serious damage.

121. Q. What must be done with the air brake or air signal couplings when not united to other couplings, on cars equipped with dummy couplings?

A. They must be secured in the dummy coupling, so that the face of the dummy coupling will cover the opening of the hose coupling so as to prevent dust and dirt from entering the hose.

122. Q. If air issues from the release port of the quick-action triple valve when the brakes are off, what is the cause?

A. It is probably due to dirt on the rubber-seated emergency valve.

123. Q. How often must the cylinder and triple valves be examined, cleaned and oiled?

A. As often as once every six months on passenger cars and once in twelve months on freight cars, and the cylinders must be oiled once every three months with a small quantity of mineral oil. The dates of the last cleaning and oiling must be marked with white paint on the cylinders.

124. Q. What is the difference between the Westinghouse quick-action passenger and freight triple valve?

A. The passenger triple valves have larger ports and slide valves.

125. Q. How may a passenger triple valve be distinguished?

A. By having but one exhaust outlet and a raised letter "P" cast on the body.

126. Q. How may a freight triple valve be distinguished?

A. By its two exhaust outlets, one being plugged.

127. Q. When should the brass graduating spring of the Westinghouse freight triple valve be replaced with a new one?

A. When it is found to be less than 3 inches in length.

128. Q. When should a brass passenger triple valve spring be replaced with a new one?

A. When it is found to be less than $2\frac{1}{4}$ inches in length.

129. Q. To what travel of piston must the brakes be adjusted?

A. Not less than five inches nor more than six inches, and this adjustment must be made whenever the piston travel is found to exceed eight inches on a passenger car or nine inches on a freight car.

130. Q. How is the slack taken up so as to secure this adjustment?

A. By means of the dead truck lever, and if that is not sufficient one or more holes must be taken up in the underneath connection and the adjustment then made by the dead truck lever.

131. Q. What are the different holes in the outer end of the cylinder levers for, and why must the connections be pinned to the proper hole for each car?

A. These holes are to enable the adjustment of the brake pressure to be made according to the weights of different cars. The connection must be made to the proper hole in each case, according to the weight of the car, so as to give proper braking power, otherwise the brake will be inefficient, or the wheels may be slid under the cars.

APPENDIX B.

RULES GOVERNING THE LOADING OF LUMBER AND TIMBER ON OPEN CARS.

DETAILED INSTRUCTIONS.

The loading of all classes of lumber and timber on open cars must be in general conformity with the following diagrams :

MATERIAL LOADED ON A SINGLE CAR.

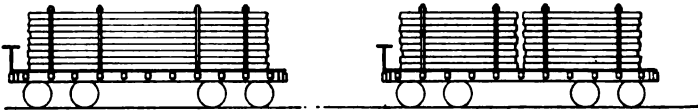


Fig. 1.

Material must be so loaded as to permit the brake at one end to be accessible and operative, and the lading at the other end must not project beyond the end of the car. Four stakes must be placed on each side of the car, and the tops of the opposite stakes must be held together by two boards, as specified. When the length of lumber will admit, it must be similarly loaded in two piles. The marked capacity of the car must not be exceeded more than ten per cent.

LOADING PART CARS OF LUMBER NOT LESS THAN 40 AND NOT OVER 65 FEET LONG.

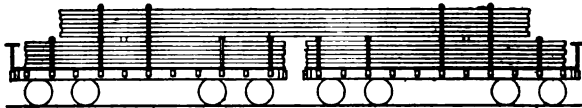


Fig. 2.

When long pieces are to be loaded on top of two cars of short pieces, they must rest on bearing pieces not less than 10 by 10 inches in section, securely fastened across the top lading of each car, and the stakes must extend up as shown and be securely fastened at the middle with wire, and both they and the short stakes must be held together at the top with either wire or boards, as per Rule 7. The short lumber must be placed centrally on each car, and the bearing pieces must be placed between the stakes and as near the middle of the car as possible, with the following distances from center to center: For lumber 65 feet long, 43 feet; lumber 60 feet long, 40 feet; lumber 50 feet long, 35 feet; lumber 40 feet long, 30 feet. The maximum aggregate weight must not exceed ninety per cent of the marked capacity of the cars, and the amount of long lumber must not exceed one-half the lading.

MATERIAL NOT OVER 42 FEET LONG.

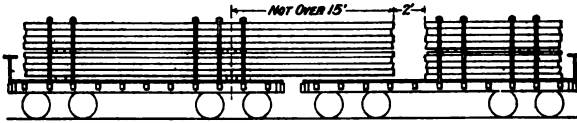


Fig. 3.

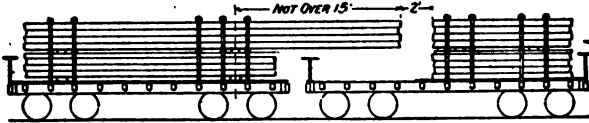


Fig. 3 A

DESCRIPTION OF LOADING AS PER FIGS. 3 AND 3-A.

This material must be carried on one car, either in the manner shown in Fig. 3, when all the material is of nearly equal length, or as shown in Fig. 3-A, when part of the material is long and part of the material is short; the second car in both instances being simply an idler. When the material is loaded in accordance with Fig. 3, the idler must invariably be a flat car, while the car carrying the load may be either a flat car or a drop-end gondola car. When the material is loaded as per Fig. 3-A, the idler may be a gondola car, provided there is a clearance of at least four (4) inches between the bottom side of overhanging material and the top of sides or brake shaft of the idler. The material on carrying car, when loaded as per Fig. 3, must rest on bearing pieces not less than eight inches wide, and of sufficient thickness to keep the ends of lumber at least four (4) inches above the floor of the idler, and in length equal to the full width of the car, to prevent the lading from touching the idler so that the cars can curve freely. These bearing pieces should be placed directly above the bolster, or as near to it as possible, but never between it and the end of the car. When the material is loaded as in Fig. 3-A, no extra bearing pieces are required on the floor of the carrying car, as the short material loaded underneath the long material will take the place of the bearing pieces. The lading overhanging the idler must not, with either style of loading, project more than fifteen (15) feet from the center of the car bolster, so that the ends will not project too far beyond the side of the car in curving. Short material may be loaded on the idler to the extent of two-thirds of its marked capacity, or the idler may be utilized in accordance with General Instructions, paragraph 3. The five stakes on each side of the carrying car should be placed as near the bolster as possible, and no stakes whatever should be used on the idler to sustain the overhanging part. The only stakes permitted on the idler will be such as may be required for the short lumber loaded on the idler. All stakes should be fastened as described in General Instructions, paragraph 7, and there must be a space of at least two (2) feet between the lading of the two cars. As the load on one truck of the carrying car is in excess of that on the other, and in direct proportion to the load on bearing pieces and the overhang, care should be taken in all cases to load as

near to the brake shaft on the carrying car as possible, but leaving the brake accessible and operative. When loaded in this manner the following are the maximum lengths and weights which may be carried on cars of given length and capacity:

LENGTH OF CARS.	LENGTH OF LUMBER.	MAXIMUM WEIGHT OF LOAD.		
		Capacity of Cars, 40,000 lbs.	Capacity of Cars, 50,000 lbs.	Capacity of Cars, 60,000 lbs.
30 feet	30 feet.	38,000 lbs.	46,000 lbs.	57,000 lbs.
	32 "	35,000 "	42,000 "	53,000 "
	34 "	32,000 "	39,000 "	49,000 "
	36 "	30,000 "	37,000 "	45,000 "
32 feet	32 "	38,000 "	47,000 "	58,000 "
	34 "	35,000 "	44,000 "	54,000 "
	36 "	32,000 "	41,000 "	50,000 "
	38 "	30,000 "	38,000 "	47,000 "
34 feet	36 "	36,000 "	45,000 "	55,000 "
	38 "	34,000 "	42,000 "	51,000 "
	40 "	32,000 "	39,000 "	48,000 "
	42 "	30,000 "	37,000 "	45,000 "

MATERIAL 40 TO 70 FEET LONG.



Fig. 4.



Fig. 5.

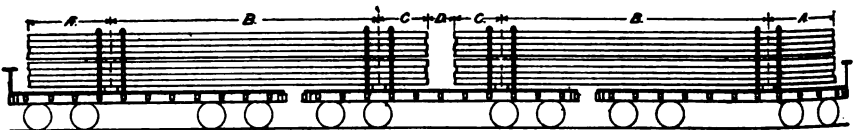


Fig. 6.

DESCRIPTION OF LOADING AS PER FIGS. 4, 5 AND 6.

This material may be loaded on two or three cars of any length, as per Figs. 4, 5 or 6, according to the quantity and lengths of material to be loaded, provided that the two end brakes are kept accessible, and the same relative proportions in the spac-

ing of bearing pieces, distance between the ladings and overhang of material are maintained, as per the following tables, which refer to Fig. 6 exclusively. The application of these tables will allow of the loading of lumber 60 feet long at one end and 40 feet at the other, or with intermediate lengths; but when so loaded the maximum aggregate weight of load must be reduced to 10,000 pounds less than given in the tables:

WHEN LOADED ON CARS 34 FEET LONG.					MARKED CAPACITY OF CARS.	MAXIMUM AGGREGATE WEIGHT TO BE CARRIED.
Length of Lumber.	A	B	C	D		
40 ft.	10 ft. 3 in.	24 ft.	5 ft. 9 in.	10 ft.	40,000 lbs.	90,000 lbs.
45 ft.	11 ft. 9 in.	27 ft.	6 ft. 3 in.	6 ft. 6 in.		
50 ft.	13 ft.	30 ft.	7 ft.	2 ft. 6 in.		
60 ft.	17 ft.	33 ft.	10 ft.	2 ft.		
WHEN LOADED ON CARS 30 TO 32 FEET LONG.					50,000 lbs.	105,000 lbs.
40 ft.	10 ft. 3 in.	24 ft.	5 ft. 9 in.	8 ft.	60,000 lbs.	120,000 lbs.
45 ft.	11 ft. 9 in.	27 ft.	6 ft. 3 in.	4 ft.		

When loaded as per Figs. 4 or 5, the loading must not exceed two-thirds of the marked capacity of the two carrying cars. When loaded as per Fig. 4, short material may be loaded on the idler to the extent of two-thirds the marked carrying capacity of that car. The stakes should be fastened together, as described by General Instructions, paragraph 7, except that the short lading may be secured as described in Fig. 1.

MATERIAL 70 TO 100 FEET LONG.

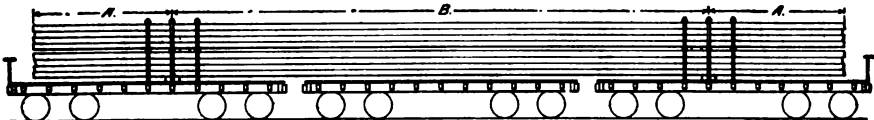


Fig. 7.

This material must be loaded on three cars. The lading must rest on bearing pieces not less than 10 by 10 inches in section, placed equally distant from the center of bolster on both carrying cars, and the lading equally divided on them. There must be at least three stakes placed as near together as possible on each side of the carrying car, securely fastened together, as described in General Instructions, paragraph 7. These stakes should either be made of material eight (8) inches wide, and of sufficient thickness to fill the stake pockets, and gained at the bottom so that they will extend onto the flooring of the car, or, after the standard stakes are in place, pieces 4 by 4 inches in section must be securely fastened to the inside of each stake. This narrows the space for lading eight (8) inches, and permits a greater overhang at both the ends and middle of the lading, without a dangerous projection beyond the

sides of the cars when they are passing around curves. Stakes or bearing pieces must not be used on the idler, and the lading must not be allowed to touch it. The following table of proportional distances between the bearing pieces, and the proper overhang for lumber of different lengths, must be observed; and when so loaded the maximum load for lumber of less than ninety (90) feet must not exceed one-half the marked capacity of the two end cars, but for lumber of ninety (90) feet and over, two-thirds of the marked capacity of these two cars will be allowed:

Length of lumber, 70 feet	.....A, 10 feet.	B, 50 feet.	A, 10 feet.
" " 80 "	.....A, 14 "	B, 52 "	A, 14 "
" " 90 "	.....A, 16 "	B, 58 "	A, 16 "
" " 100 "	.....A, 18 "	B, 64 "	A, 18 "

LOADING MATERIAL ON GONDOLAS.

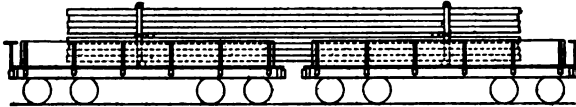


Fig. 8.

Long material may be loaded on gondola cars that have drop end gates, provided that when loaded on two cars, bearing pieces of not less than 8 by 8 inches are used to keep the lading clear of the end gates and floor by at least three (3) inches, and in addition to the bearing pieces on the floor there is a clearance of at least eighteen (18) inches between the load and the car sides to provide for curving. This clearance may be obtained by the use of stanchions, not less than 4 by 5 inches in section, placed in a vertical position, and securely fastened by cleats to the floor bearing pieces in such a manner as to make the floor bearings serve as a brace between them, and be fastened together as described in General Instructions, paragraph 7. Not more than two gondolas must be used together, and the lading must not exceed two-thirds of the marked capacity of the two cars.

CHAINING OF CARS WHEN LOADED WITH LONG LUMBER.

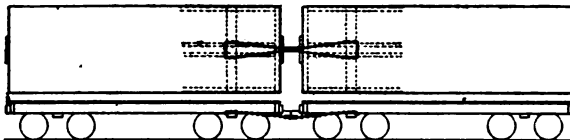


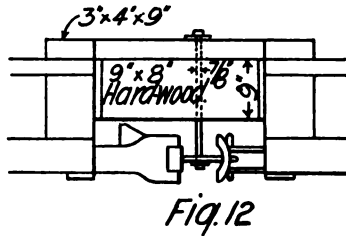
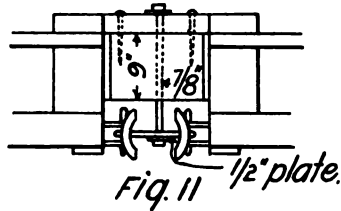
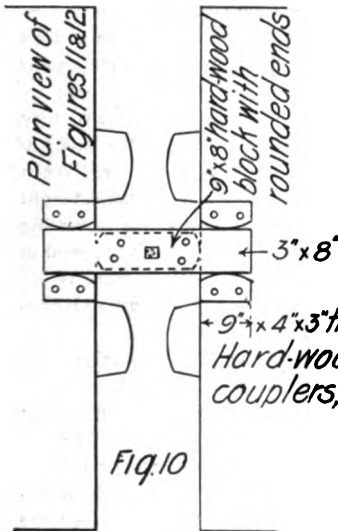
Fig. 9.

The use of chains is optional. On such roads as require their use, cars must be chained together with chains made of not less than three-quarter ($\frac{3}{4}$) inch iron passing over body bolsters and across under sills, forming a loop back of bolster and doubling to point of coupling between the two cars, as per Fig. 9, unless cars are provided with safety chains. These chains should be made as short as possible with-

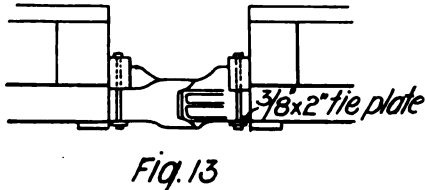
out taking the strain off of drawbars when springs are compressed. At interchange points chains will either be removed, or the receiving road will furnish the delivering road with chains of the same quality and dimensions as those received.

METHOD OF BLOCKING CARS APART.

Whenever the lading is carried on more than one car, all slack between the cars must be removed by the use of spacing blocks, as shown in Figs. 10, 11, 12 and 13. In blocking cars apart they must be separated until all slack is taken up. The spacing blocks must then be neatly fitted between the cars and secured in the manner shown. All wood must be sound yellow pine or its equivalent as a hardwood.



Hard-wood pieces 3 3/4 x 6 x 12 clamped to couplers, with two 5/8 bolts, one on each side.



GENERAL INSTRUCTIONS.

1. When two or more cars are required to carry the lading, the consignee and destination of all the material must be the same. When more than one car is used, the lading must always be kept clear of the floor of the cars, whether a carrying car or an idler. Both cars carrying the load must be considered of the same capacity as the one of lesser capacity. Flat cars must always be used for loading lumber too long for one car, except as specified in Figs. 3, 3-A and 8. On single cars, or in the end cars of a group of cars, the lading must not extend beyond the end sills.

2. If the lading consists of piles or telegraph poles or other round timber, they must be loaded with the butts and tops alternating, and if the lading occupies two or more cars, it must rest on bearing pieces of not less than 8 by 8 inches in section, and each tier must be separated by strips over the bearing pieces and be well wrapped with wire around the middle and both ends to prevent shifting. In all cases there must be at least three pairs of stakes at each end of lading, securely fastened with wire, as described in General Instructions, paragraph 7.

3. Where the lading projects so as to necessitate the use of an idler, and there is sufficient material in one consignment, another car may be loaded in reverse order and one idler serve for both cars, and the space between the projecting ends may be utilized to load the idler with short lumber; but in all cases there must be at least two feet between the ends of such loadings. The lading of the idler must not exceed two-thirds its marked capacity.

4. Where the dimensions of bearing pieces are not otherwise specified they must be not less than 8 inches wide and of sufficient thickness to keep the lading at least four inches clear from the floor, and extend the full width of the car. When the height of the bearing pieces are specified as over 5 inches, the additional height may be obtained by the use of a plank securely nailed to the upper side of bearing pieces. The bearing pieces must never be placed between the bolster and the end of the car, but either between the bolsters or directly above them. When there is but one bearing piece on the car, it must be placed at a distance of at least 12 inches from center of bolster toward center of car.

5. Where the maximum weights are not specified in these instructions, the usual excess will be allowed.

6. All stakes must be sound, straight-grained lumber, free from knots that would materially impair their strength (hardwood preferred), and of full size to reasonably fit the stake pockets. All spacing blocks between cars to be made of hardwood, and sound in every way. Care must be taken to keep the stakes from spreading at the top while cars are being loaded, and in no case must the load exceed the width of the car.

7. Opposite stakes must always be fastened together at the top with either wire or boards. In cases where the lumber is confined to one car, and does not project beyond the end more than one foot or is less than three and one-half feet high and does not project beyond the bearing pieces more than nine feet, the stakes should be secured at the tops only. In cases where the load is more than three and one-half feet high and projects beyond the bearing piece more than six and less than nine feet, the stakes at the projecting end must be secured at the tops with wire. When the load is more than three and one-half feet high and projects beyond the bearing piece

more than nine feet, or where the load is more than four feet high and projects more than six feet beyond the bearing piece, or is carried in two or more cars, the stakes must be secured in the middle with wire, and at the top with either wire or boards. The wire used should be equal to six strands or three wrappings of No. 8 telegraph wire, and the stakes must be notched to prevent the wire from slipping. When boards are used there must be two to each pair of stakes 1 by 4 inches in section, securely nailed to each side of the stakes with not less than two tenpenny nails on each side and end. When stakes are wired at the middle there should be a bearing piece across the lading of such size as to keep the material apart sufficiently to protect it from injury by these wires.

8. All cars must be so loaded as to leave the brake accessible and operative. There must be a clearance of at least four inches between the brake wheel and the lumber — one brake for one or two cars, and two brakes for three or five cars.

RULES FOR LOADING LARGE LOGS, PIPE AND STONE ON OPEN CARS.

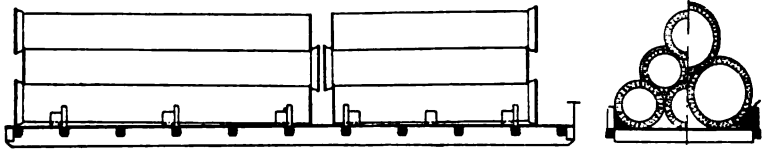


Fig. 1B

All logs or pipes twenty-four inches and over in diameter must be loaded in pyramidal form, as shown in Fig. No. 1-B, with the large ends of the first course toward the end of car, and securely blocked with three pieces on each side of each pile not less than eight (8) inches thick and one-third the diameter of the logs or pipe in height, neatly fitted to and driven under the outside of the logs or pipe, shouldered or beveled at the outer end and securely fastened to the floor of the car and stakes with four (4) twenty-penny nails to each block, two through the end, and one properly toe-nailed through each side of the block. Blocking of more than fourteen (14) inches in height will not be required, but on loadings of material three feet and over in diameter there must be an additional blocking formed by a plank of not less than two (2) inches thick, fitted under the outside of lading and spiked to each stake with four (4) twenty-penny nails, as shown at A. There must be stakes of not less than fifteen inches high above the floor of the car, placed near the ends of each pile of lading on both sides of car, the quality and fitting of such stakes to conform to rules for loading of lumber.

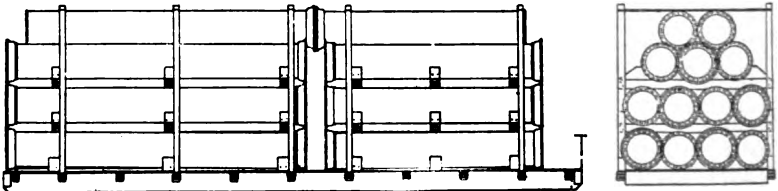


Fig. 2B

Logs or pipes of less than twenty-four inches in diameter may be loaded as per Fig. No. 2-B. The first course must be loaded as per Fig. No. 1-B, except the wedges may be only six (6) inches thick. Each course above this must have bearing pieces of not less than 6 by 6 inches in section, extending across the lading and secured to the stakes with two (2) twenty-penny nails at each stake. Upon top of these bearing pieces, blocking of the same description as those on the floor must be placed and secured in the same manner. There must be a pair of stakes near each end of each pile, and when the material is more than twelve and less than eighteen

feet long, or more than four feet high, there must be an intermediate pair of stakes. When over eighteen feet long there must be four pairs of stakes. All stakes must be fastened together at the tops with wire.

The methods of fastening and quality of stakes to conform to the rules for same governing the loading of lumber.

CLEATING OF STONE.

All stone loaded on flat cars must be cleated with strips of not less than one and one-half inches thick by four inches wide, securely fastened to the floor of the car with one (1) twelve-penny fence nail to every nine inches, such nails to be staggered so as to be within one inch of the edge of the strip alternately.

REGULATIONS IN REGARD TO THE LOADING AND CARRYING OF LONG STRUCTURAL MATERIAL, PLATES, RAILS, GIRDERS, ETC.

GENERAL INSTRUCTIONS.

1. On account of the great variety of form and weight of long structural material, no general rules can be made to suit all cases. The following regulations are, therefore, intended to cover only the most common forms. When material cannot be loaded in accordance with these regulations, special instructions must be asked for.

2. Cars to be used for shipments of this character must be carefully examined before loading and all defects must be remedied before the cars are loaded. Great care must be taken not to overload cars, and in the case of very long or very heavy material the truss rods should be screwed up tight. The weight of the lading carried on any car must be governed not only by the marked capacity of the car but also by its general construction, as well as by the number and location of the bearing pieces upon which the load rests. The regulations covering these points are given in the Detailed Instructions for each form of lading and must be strictly adhered to. The only exceptions are for cars which have been specially prepared for the shipment of particular forms of material.

3. Material over forty feet long carried on two or three cars must always be examined by a competent inspector before the cars are moved from the loading point. If an inspector is not stationed at the loading point, the agent must give notice to the proper authority when the cars are loaded, so that proper inspection may be arranged for. The object of such inspection is to see that these regulations have been complied with.

3½. Cars intended to carry twin and triple loads, as per Figs. 10, 11, 12, 12-A, 12-B, 13 and 14, when weight of lading will equal half capacity of car or over, must have the bolster side bearings carefully examined before loading in order that when loaded the trucks may curve freely.

4. All cars must be so loaded as to leave the brake accessible and operative. There must be a clearance of at least 4 inches between the brake wheel and the material; one brake for one or two cars and two brakes for three cars.

When a single car is used the lading at the opposite end from the brake must not project beyond the end sill, except in the following case: When the lading is too long to go inside the car but will not extend more than six inches beyond the end sill, such method of loading will be permitted, providing the projecting ends of the material will clear six feet six inches above the rail.

When several cars are loaded with material requiring idlers, as in Figs. 5 and 6, there must not be any more of these cars close together in a train than that there will be one brake operative for one or two cars and two brakes for three or five cars.

5. In all other cases when the lading extends beyond the end sills of the car an idler must be used (which may be loaded as specified in paragraph 16), or the material must be loaded on two or three cars as the case may demand, and as explained under Detailed Instructions below.

6. Long iron, rails, bridge material, channels, angle iron, etc., should, whenever possible, be loaded on single gondola cars inside the end gates, which must in

all cases be raised and securely fastened. Single flat cars must not be used for rails or bar iron, unless furnished with substantial end boards to prevent shifting of the load.

When plates are loaded on the floor of single high-side gondola cars, bearing pieces must be placed on the floor to facilitate the removal of the lading. These bearing pieces should be not less than 3 by 4 inches in section, extending the width of the car. There should be not less than two bearing pieces to a car.

7. Whenever the lading is carried on more than one car, all slack between cars must be removed by the use of spacing blocks in the manner described in Detailed Instructions. Cars must also be chained together in order to prevent parting in case of failure of the couplings. When cars are used which are not permanently equipped with safety chains, chains made of not less than $\frac{3}{4}$ -inch iron must be passed around the body bolsters and across under sills, forming a loop back of bolster and doubling to point of coupling between two cars, and so tie them together. These long chains must only have a sufficient amount of slack to permit the cars to curve. At interchange points the chains will either be removed or the receiving road must furnish the delivering road with chains of the same quality and dimensions as those received.

8. Bearing pieces must never be placed between the bolster and the end of the car, but either between the bolsters or directly above the bolsters. When only one bearing piece is used on a car, as in Figs. 13 and 14, it must be placed at a distance of at least 12 inches from center of bolster toward center of car.

Bearing blocks which are placed flat on the floor of the car may be composed of built-up lumber if securely nailed together to prevent displacement of the parts.

9. All spacing blocks between cars, clamping pieces, swinging bolsters, stakes, when over four feet high, and bearing pieces located on top of sides of cars, with loads of half capacity and over, as in Figs. 6, 10, 12 and 12-A, must be of hardwood and sound in every way. Bearing pieces for twin loads as in Fig. 9, if made of built-up lumber as described in paragraph 8, must have the top piece of hardwood. Dimensions are, however, intended to be general only, but represent the least allowable sizes which must be used for loads exceeding one-half the capacity of the car. For lighter loads the dimensions may be proportionately decreased, except where the size of timbers given is governed by the required clearance; however, any material that may be suitable for blocking which differs from the figures given, but which is of equal strength or stronger, may be utilized.

10. Height and width of lading must be governed by tunnel and bridge limits of roads over which lading is to pass.

11. When two or three cars are used, cars carrying load must be considered of the same capacity as the one of lesser capacity.

DETAILED INSTRUCTIONS.

LOADING OF SINGLE CARS WITHOUT IDLERS.

12. Large girders, loaded on flat side on flat cars, must always be carried upon bearing blocks not less than 4 by 12 inches, which must be placed one over each bolster and secured to the floor with two $\frac{7}{8}$ -inch bolts. When two or more large girders are carried on a flat car the bearing blocks must be not less than 6

by 12 inches, and fastened in the same manner to the floor. In addition, spacing blocks not less than 3 by 12 inches must be placed between each girder. Lateral motion must be prevented by means of upright iron stanchions, driven into holes in the bearing pieces and held together at the top by not less than 2 by 6 inch planks, as shown in Fig. 2, or it may be prevented by fitting planks between flanges of the girders, as shown in Fig. 3. To prevent longitudinal motion, angle plates, five inches or six inches wide by one-half inch thick, must be bolted firmly to the lower girders close to the bearing pieces, as shown in Fig. 1, or if rivet holes are not available it may be prevented by clamps, as shown in Fig. 4. The upper girder must be held to the lower girder by diagonal flat iron braces bolted to both girders, as shown in Fig. 1. If, however, girders are clamped together, as shown in Fig. 4, the diagonal flat iron braces need not be applied.

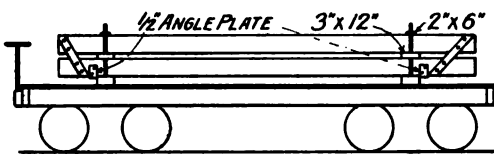


Fig. 1.

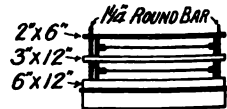


Fig. 2.

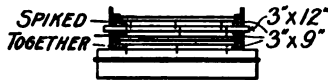


Fig. 3.

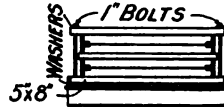


Fig. 4.

LOADING OF SINGLE CARS WITH IDLERS.

13. When the lading is too long to go inside of a car and extends more than six inches beyond the end sill, such loading will be permitted if an idler or idlers are provided to protect the overhanging part of the loads, as in Figs. 5, 6 and 8; but in these cases the length of the permissible overhang must be governed by the width of the lading and its height above the rail, and it must in no case exceed the figures given below, which are based on clearance required on a twenty-degree curve, it being understood that the load must be placed centrally on the car and the amount of overhang measured from center of bolster of the carrying car.

For loading in accordance with Figs. 5, 6 and 8:

8 feet wide.....	10 feet overhang.
7 feet wide.....	14 feet overhang.
6 feet wide or less.....	18 feet overhang.

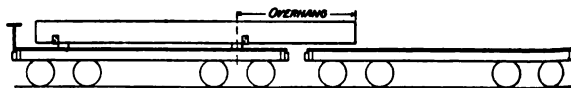


Fig. 5.

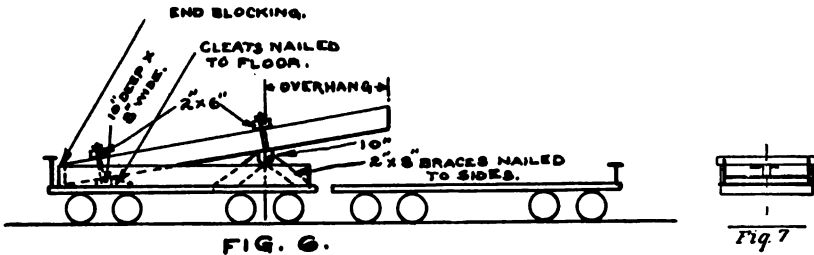


FIG. 6.

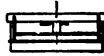


Fig. 7

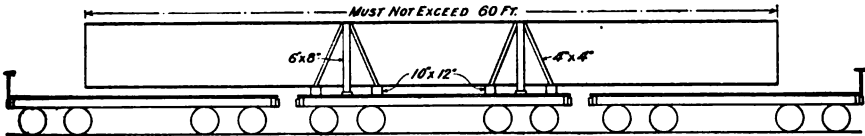


Fig. 8.

14. To prevent overloading of the truck under the overhanging end, as shown in Figs. 5 and 6, the carrying capacity of the car will decrease in the following manner as the length of the overhang increases:

For overhang not exceeding 5 feet, car may carry full marked capacity.

For overhang not exceeding 10 feet, car may carry three-fourths of the marked capacity.

For overhang greater than 10 feet, car may carry one-half the marked capacity.

However, should the overhanging material consist of a few pieces only, with a total weight not exceeding 2,000 pounds, the car may carry full marked capacity.

15. (a) The idlers used with loads, as shown in Figs. 5 and 8, must be flat cars, unless the width of the overhanging part of the lading is at least 3 feet less than the width given for each length of overhang in the table in paragraph 13, in which case drop-end gondola cars may be used.

(b) The idler used with loads as shown in Fig. 6 may be a low-side gondola car, but must not be a high-side gondola car.

16. The idlers may be loaded with any suitable material, provided the consignee and the destination of the material on all the cars are the same. There must be, however, a space of at least 2 feet between the loadings on the carrying car and on the idler. The carrying capacity of the idler depends upon how far the overhang extends over the idler, and must not exceed the following figures, except with loadings as in Fig. 6, in which the overhang may be so far above the floor of the idler as not to interfere with its lading. In such cases the idler may carry full marked capacity.

When overhang does not extend over idler more than 5 feet, full marked capacity.

When overhang does not extend over idler more than 10 feet, three-fourths of the marked capacity.

When overhang extends over idler more than 10 feet, one-half of the marked capacity.

17. When large girders are loaded, as shown in Fig. 5, they must be secured to carrying car as explained in paragraph 12.

18. When material is loaded on gondola cars and is longer than the body of the car, as shown in Fig. 6, one end must rest on a bearing piece not less than 10 inches wide and of sufficient depth to prevent the lading at end of car from touching the floor. The bearing piece to be placed on the floor above the bolster and extending the width of the car, and must be secured from shifting by cleats nailed to the floor. The end boards at this end of the car must be protected by blocking fitted between the side boards so as to prevent all parts of the load from injuring the end boards of the car. The thickness of the blocking may vary according to the weight of the lading, but should never consist of less than one 3-inch plank set on edge for load of less than one-half the capacity, nor less than two 3-inch planks or their equivalent for loads of more than one-half the capacity of the car. If, however, the lading which butts against the end boards consists of only a single piece or two of a weight not exceeding a total of 6,000 pounds, no end blocking is required. When the lading consists of very flexible material, as plates, no bearing piece is required on the floor of the car, but blocking must be used to protect the end boards. The other end of the load must rest upon a bearing piece, square or round, preferably square, not less than 8 by 10 inches if square cornered, nor less than 10 inches in diameter if round, for loads of over half the capacity, and proportionately smaller to less weight of lading. This bearing piece must rest upon the side boards of the car, within one foot on either side of the center, above the bolster, and must have the ends notched for the side boards and be securely braced to prevent both lateral and longitudinal motion, as well as bending and rolling. Figs. 6 and 7 show substantially how both bearing pieces are to be secured. If the overhanging material is very flexible and interferes with the end boards of the adjacent car, a suitable bearing piece protected by a strip of iron must be placed on the adjacent car to support the material. To prevent the load from shifting in a lateral direction on the bearing pieces, iron stanchions tied together at their upper ends must be used on both bearing pieces, as described in paragraph 12.

19. A method of loading especially adapted to long lattice girders, which may be injured if loaded on more than one car, is shown in Fig. 8. For loads of this character four bearing pieces must be placed in pairs on the carrying car, each pair being placed centrally above the bolster, with a distance apart of not over 5 feet nor less than 3 feet; they must be fastened to the floor with bolts, as explained in paragraph 12, and the upright supports must have side braces. Braces or tie-rods must be secured to the overhanging ends and to the bearing pieces, as shown in Fig. 17. Longitudinal motion must be prevented by the use of plates or clamps, as explained in paragraph 12.

LOADING OF TWO OR THREE CARS WITH OR WITHOUT IDLERS.

20. Material which in length exceeds the limits given for the loading of one car must be loaded on two or three cars, as shown in Figs. 9, 10, 11, 12, 12-A, 12-B, 13 and 14. With loads of this character the lading must never exceed the maximums given in paragraph 26, the carrying cars must always have all slack between them removed by the use of spacing blocks, as described in detail in paragraph 28, and the cars must be chained together, as explained in the General Instructions, paragraph 7.



Fig. 9.

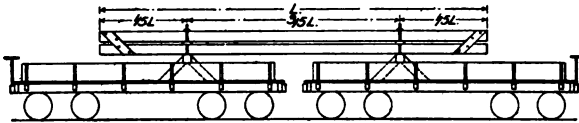


Fig. 10.

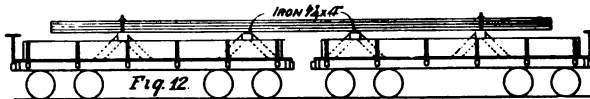


Fig. 12

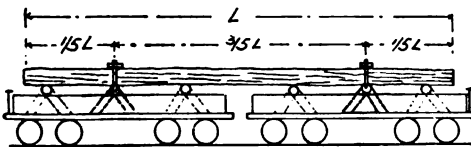


Fig. 12 A

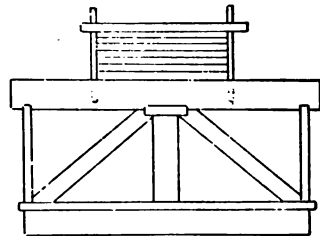
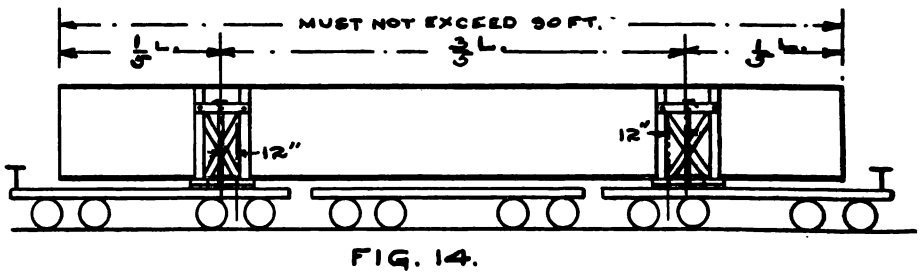
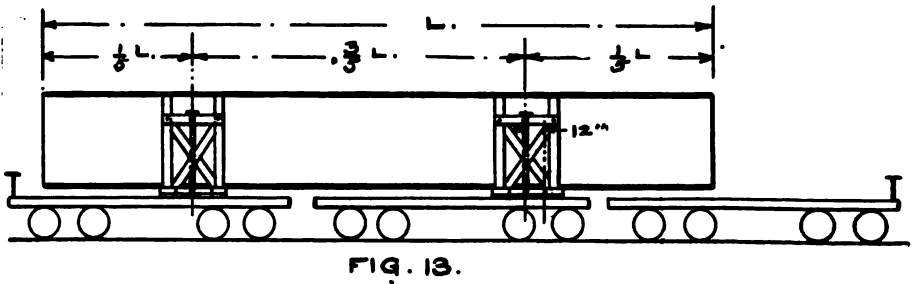
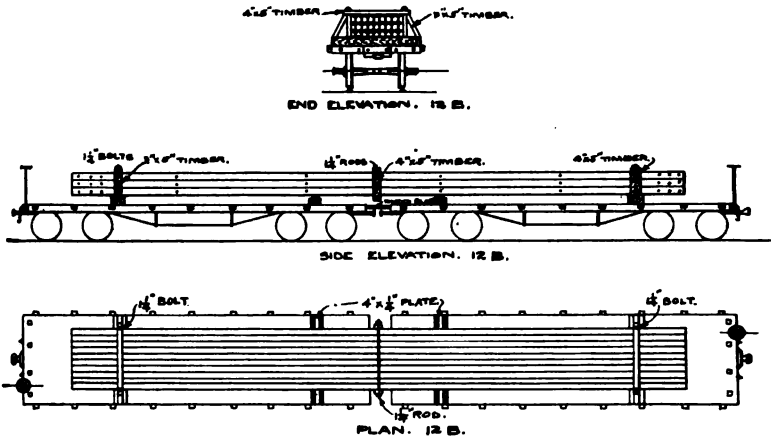
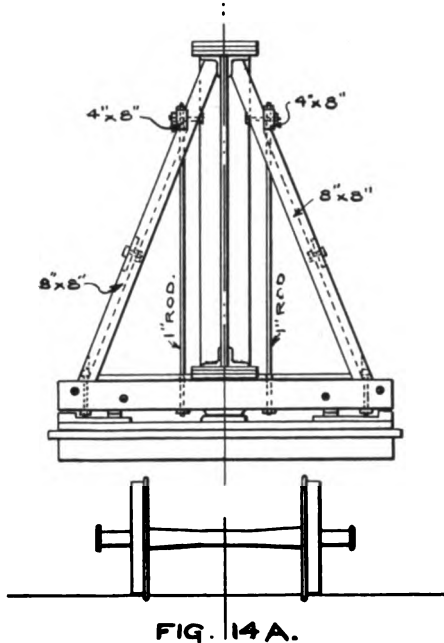


Fig. 13 A





21. Material loaded on gondola cars with drop ends or open ends or on flat cars, as shown in Fig. 9, must have one bearing piece not less than 10 inches wide by 12 inches deep secured to the floor of each car with two $\frac{7}{8}$ -inch bolts. Lateral and longitudinal motions must be prevented in the manner described in paragraph 12. In the case of gondola cars, a clearance of at least 18 inches between the load and car sides must always be provided for curving. The clearance must be measured at the narrowest part of the car.

22. Material loaded on gondola cars without drop ends, as shown in Figs. 10 and 12, must have bearing pieces placed on the top of the side boards, of the same size and secured in the same manner as described in paragraph 18. The lading must be secured from lateral and longitudinal motion as described in paragraph 12.

23. Long flexible material, like plates, etc., which cannot be loaded as shown in Fig. 6, must be loaded on four or more bearing pieces, as shown in Figs. 11, 12 and 12-A. If loaded on four bearing pieces, as in Figs. 11 and 12, the two center bearing pieces must be 4 inches lower than the end pieces and have flat iron $\frac{1}{4}$ inch by 4 inches secured to their upper sides, either with spikes or lag screws at each end. These iron pieces, which are intended to facilitate curving, must extend at least 16 inches beyond each side of the lading AND MUST BE COATED WITH GREASE BEFORE THE LADING IS PLACED UPON THEM. The bearing pieces must be secured to the car and the material clamped together to prevent it from shifting, in the manner described in paragraphs 12 and 18. The bearing pieces at each end of

the load are the only ones to be provided with stanchions. When the bearing pieces are located near the center of the cars, as is the case with the end pieces in Fig. 12, and when the load so carried is equal to one-half of the capacity or over, the bearing pieces must be secured with lateral bracing pieces, as shown in Fig. 13-A, to prevent the breaking down of the sides when going around curves. When material is loaded on four bearing pieces on gondola cars with drop ends, the same clearance must be provided between the lading and the car sides, as specified in paragraph 21. If more than four bearing pieces are required to properly support the lading, the center pieces only on each car must be provided with upright stanchions, as described in paragraph 12 and as shown in Fig. 12-A, all other bearing pieces to have flat iron secured to their upper sides to allow for curving, as provided for above. The spacing of the bearing pieces on the cars must be so arranged that the distance between the two center bearing pieces is about three-fifths of the total length of the lading, and the overhangs at each end one-fifth of the lading, as shown in Fig. 12-A. For loads of this kind the overhang is measured from the center bearing pieces to the end of the material, and must not exceed in length the figures specified in paragraph 13, for the respective width of the load. If, in order to make up the allowable carrying capacity of the cars, short material is loaded on the floor, with loads as per Figs. 10, 12 and 12-A, such material must be loaded in equal amounts on both sides of the car, so as to be properly balanced and not interfere with the curving of the trucks.

"T" and girder rails 60 to 65 feet long may be loaded on four bearing pieces, if desired. When so loaded the height of the center bearing pieces must be governed according to the flexibility of the material, as follows:

For material less than 6 inches, center bearing pieces to be 4 inches lower than end pieces.

For material 6 inches or over, center bearing pieces to be 2 inches lower than end pieces.

Flat iron must be placed on center bearings, and other conditions to be followed described above, and as shown by Fig. 12-B.

24. Large girders loaded on edge, as shown in Figs. 13 and 14, on two or three cars, either with or without idler, must be supported on two swiveling bolsters. The construction of the bolster should be governed according to the shape or weight of the girders.

Thus, girders 50 feet long and over and 8 feet high and over should invariably rest on crib bolsters firmly bolted together, and to have double upright braces on each side, as shown in Figs. 13, 14 and 14-A.

Girders which do not exceed the above dimensions do not require crib bolsters, but may be supported on single bearing pieces with one upright brace on each side of bolster, as shown in Figs. 15 and 16.

When loading girders which exceed in weight one-half the marked capacity of the cars, and when the location of the bearing pieces is over three feet away from either cross bearers or car bolsters, the car floor should be reinforced by bearing pieces immediately underneath the bolsters, as shown in Fig. 15. These bearing pieces must be securely fastened to car floor, as described in paragraph 12, and must be not less than 6 inches deep by 18 inches wide.

King bolts, center bearings and side bearings must be used for either kind of bolster, and both center bearings and side bearings for the upper bolster must move

WHEN LOADING LATTICE GIRDERS, OR IF IT IS CONVENIENT TO REMOVE RIVETS IN PLATE GIRDERS, A ROD NOT LESS THAN $\frac{3}{4}$ " DIA. MAY BE USED TO TIE BRACES TOGETHER, AS SHOWN IN DOTTED LINES

BRACES MAY BE SECURED TO BOLSTER EITHER AS SHOWN IN FIG 15 WITH ANGLE PLATES, OR WITH BOLTS AS IN FIG 16

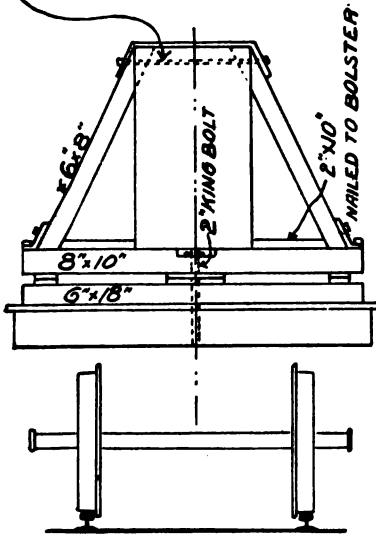


Fig 15

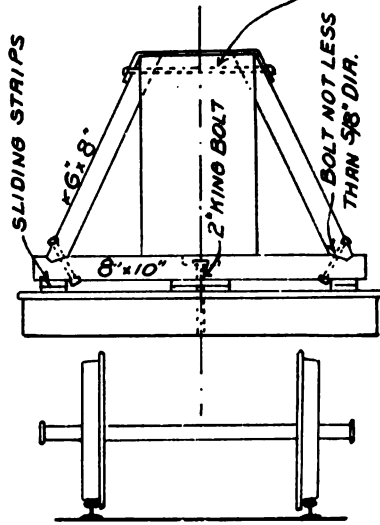


Fig 16

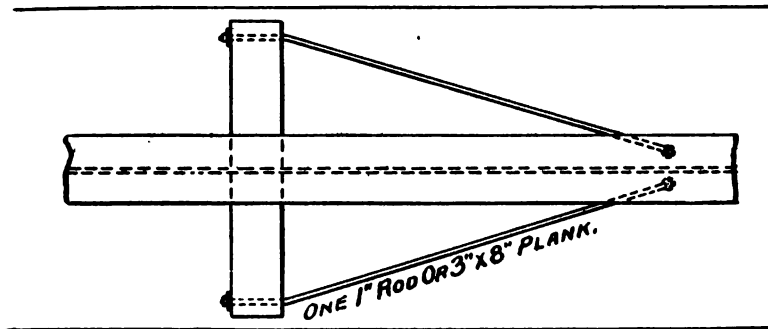


Fig. 17.

on corresponding bearings, secured either to the lower bolster or to the floor of the car, as the case may be. When wrought-iron plates are used for side bearings the lower plate must be fastened to the car floor with countersunk screws, or with two lag screws at each end, placed at least 12 inches away from sides of bolsters.

Girders which are not loaded on crib bolsters must be secured to the upper bolster with diagonal tie-rods or braces, as shown in Fig. 17. If braces are used they must be not less than 3 by 8 inches. The diagonal side braces between the top flange of the girder and the outer ends of the bolster must be secured in either of the methods shown in Figs. 14-A, 15 and 16. When the lading consists of two or more girders standing side by side or lying on their sides, they must be securely fastened to each other, as described in paragraph 12.

25. The location of the bolsters depends upon the length and the width of the girders, as well as upon their stability, and they should, if possible, be so placed that the length of each overhanging end is not more than one-fifth and the distance between the bolsters not less than three-fifths, of the total length of the girder. The following table gives locations of bolsters for girders of maximum length and width based on clearance required on a twenty-degree curve:

60 feet long by 8 feet wide or less, bolsters not less than 36 feet between centers.
 70 feet long by $7\frac{1}{4}$ feet wide or less, bolsters not less than 42 feet between centers.
 80 feet long by $6\frac{1}{2}$ feet wide or less, bolsters not less than 48 feet between centers.
 90 feet long by $5\frac{1}{2}$ feet wide or less, bolsters not less than 54 feet between centers.

In cases of material of less width than $5\frac{1}{2}$ feet but of greater length than 90 feet, application must be made to the proper authority for special instructions.

26. To prevent overloading, the following regulations must be adhered to:

(a.) For loads carried on one bearing piece per car located near the center of car, as in Fig. 9: On flat cars having only two truss rods the weight of lading must not exceed one-half of the marked capacity of car. On flat cars having more than two truss rods, and on low-sided gondola cars, the weight of lading must not exceed two-thirds of the marked capacity of car.

(b.) For loads carried on one bearing piece per car located about equal distance from center of car and center of truck, as on end car in Fig. 13: On flat cars having only two truss rods the weight of lading must not exceed two-thirds of the marked capacity of car. On flat cars having more than two truss rods, and on low-sided gondola cars, the weight of lading must not exceed three-fourths of the marked capacity of car.

(c.) For loads carried on one bearing piece per car located at or near center of the truck, as on center car in Fig. 13, and on end cars as in Fig. 14, or on top sides of high-sided gondola cars as in Fig. 10, the weight of lading must not exceed one-half of the marked capacity of car.

(d.) For loads of long flexible material carried on two bearing pieces on each car, as in Figs. 11 and 12, the weight of the lading must not exceed three-fourths of the marked capacity of the car.

For "T" and girder rails 60 to 65 feet long loaded on flat cars, or on gondola cars with drop ends, in accordance with paragraph 23 and Fig. 12-B, the weight of the lading may be equal to the marked capacity of the car. For loads carried on three bearing pieces on each car, as in Fig. 12-A, the weight of the load so carried must not exceed one-half of the marked capacity of the car, but short material may be carried in addition on the floor of the cars, providing the total weight of the load does not exceed three-fourths of the marked capacity of each car.

BLOCKING CARS APART.

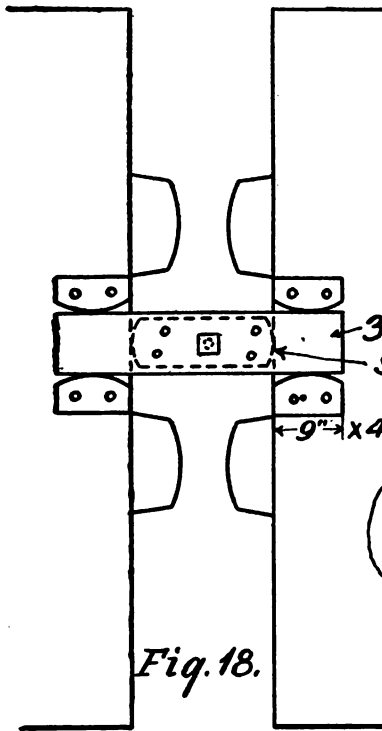


Fig. 18.

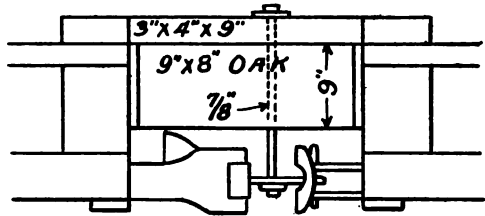


Fig. 20.

FOR PLAN VIEW SEE Fig. 18.

3"x8"
9"x8" OAK BLOCK WITH ROUNDED ENDS.
9"x4"x3" THICK SPIKED TO CAR.
OAK PIECES 3 3/4"x6"x12" CLAMPED
TO COUPLERS WITH TWO 5/8" BOLTS,
ONE ON EACH SIDE.

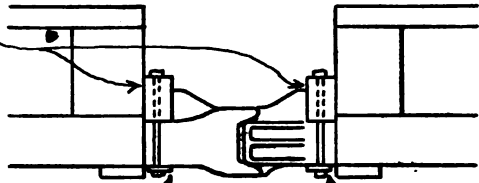


Fig. 21.

3/8"x2" TIE PLATES.

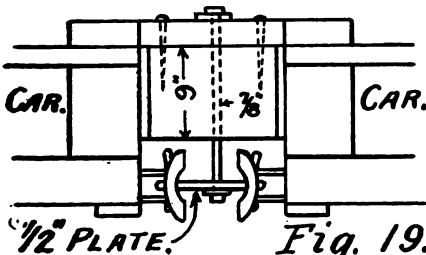


Fig. 19.

27. The method of blocking cars apart to be used when a load is carried on two adjacent cars, or when it is carried on two cars separated by an idler, is shown in Figs. 18 to 21, inclusive. Figs. 18 and 19 represent both the cars with ordinary drawheads. Fig. 20 represents one car with M. C. B. coupler and the other car with ordinary drawhead. Fig. 21 represents both cars with M. C. B. couplers. In blocking cars apart they must first be separated by means of jacks until all the slack in the springs, couplers or links, if the latter are used, has been taken up; the spacing blocks must then be neatly fitted between the cars and secured in the manner shown. All wood used must be sound oak.

Obituary.

FRANCIS J. FERRY.

Francis J. Ferry, Master Mechanic of the Louisville, Henderson & St. Louis Railway, was born at Villenova, Chautauqua County, New York, September 5, 1845, and died Thursday morning, November 4, 1897, just at dawn of day, at Cloverport, Kentucky. His wife and six children survive him.

Mr. Ferry was for years locomotive engineer on the Grand Rapids & Indiana Railroad, and for several years Traveling Engineer for the same company, and later he was for a number of years Master Mechanic of the Toledo, Saginaw & Muskegon Railway, now a part of the Grand Trunk Railway System. He left the Toledo, Saginaw & Muskegon Railway about ten years ago, and since that time and until the time of his demise he was Master Mechanic of the Louisville, Henderson & St. Louis Railway, with headquarters at Cloverport, Kentucky, rendering valuable service to the company and giving its interests his undivided attention.

He was a perfect gentleman, a faithful husband, an affectionate father, and an honorable and upright citizen, being esteemed by all. His funeral was one of the largest ever held in the city of Cloverport, being conducted by the Methodist Church, of which he was a member. After the church services the body was taken in charge by the Masonic Lodge, of which he had been a member since May 30, 1892, and was laid to rest in the Cloverport cemetery, under the beautiful ceremony of that order.

Mr. Ferry became a member of the Master Car Builders' Association in 1893, and was a member at the time of his death.

D. VAN ALSTINE,
P. LEEDS,
CHARLES WAUGHOP,
Committee.

INDEX.

A.

Address of Ashley W. Cole, 27-30.
 " A. P. Knapp, 25-26.
 " J. H. McConnell, 31.
 Adjournment, 237.
 Adjusting height of drawbars, recommended practice, 392.
 Air-brake details, topical discussion of, 216-218.
 Air-brakes, general arrangement and details, standard, 372, 373.
 Air-brake repair card, recommended practice, 385.
 Air-brake and signal instructions, report of committee on revision of, 189-192.
 Air-brake and signal instructions, recommended practice, 386, 402-425.
 Air-brake hose specifications, report of committee, 154-174.
 Air-brake tests, recommended practice, 393-397.
 Amendment of constitution proposed, 202.
 " " by-laws adopted, 202.
 Arbitration Committee, report on report of committee on conference with auditors, 92-93; decisions approved, 235, 236.
 " " report of, 238; cases arbitrated, 243-321.
 Arch bars for 80,000-pound capacity cars, recommended practice, 389.
 Associate members, W. D. Crossman, E. A. Phillips, elected, 44; C. F. Street, proposed, 234.
 Attachment of couplers to cars, 389.
 Auditing committee, election of, 43, 44; report of, 132.
 Axles, topical discussion of, 218-222.
 Axle, with journals, $3\frac{1}{2}$ by 7-in., standard, 371.
 " " " $4\frac{1}{4}$ by 8-in., " 371.
 " " " 5 by 9-in., " 371.

B.

Bolt heads, 376-379.
 Brake beam, standard, 372.
 " head, " 372.
 " shoe, " 372.
 Brake shoe testing apparatus, transfer of to Purdue University, 82, 83.
 Brake shoe tests, report of committee, 81, 82.
 Buffer blocks and location, 374.
 By-laws, 23, 24; amendment of, 202.

C.

Car repairs done west of 105th meridian, compensation for, 105-108; 111-134.
 Catalogues, standard size of, 376.
 Chamberlain, J. T., elected first vice-president, 236.
 Check chains, recommended practice, 383.
 Check gauge, standard, 375.
 Cole, Ashley W., address of, 27-30.
 Collection of salt-water drippings, recommended practice, 399.

Column bolt for 80,000-lb. capacity cars, 389.
 Committee, auditing, election of, 43, 44; report of, 132.
 " correspondence and resolutions, appointment of, 120; report of, 235.
 " nominating, appointment of, 43; report of, 104, 105.
 Committee on arbitration, report of, 238-242.
 " brake shoe tests, report of, 81, 82.
 " care of journal boxes, report of, 132-141.
 " conference with auditors, report of, 55-60; referred to arbitration committee, 60; committee discharged, 93.
 " correspondence and resolutions, report of, 235.
 " light weight of cars, appointment of, 91; report of, 133.
 " passenger car pedestal and journal box for journal $4\frac{1}{2}$ by 8-in., report of, 198, 199.
 " prices in M. C. B. rules, report of, 108-111.
 " revision of air brake and signal instructions, report of, 189-192.
 " rust from salt-water drippings, 83-87; discussion on, 87, 88.
 " specifications for air-brake hose, report of, 154-173.
 " springs for freight car trucks, report of, 175, 176.
 " square bolt heads and nuts, standards for pipe fittings, report of, 152-154.
 " standard wheel and track gauges, 81.
 " steel car framing, report of, 193-197.
 " subjects for 1899, report of, 234.
 " supervision of standards and recommended practice, report of, 45-54; discussion of, 52-55.
 " thermal tests for car wheels, report of, 182-188.
 " triple valve tests, report of, 60, 61; discussion on, 61-64.
 Committees, for 1898-9, 5, 6.
 " standing, 4.
 Compensation for car repairs done west of 105th meridian, discussion on, 105-108; 111-134.
 Conference with auditors, report of committee on, 55-60; referred to arbitration committee, 60.
 Constitution, 13-22; amendment proposed, 202.
 Contour lines, automatic coupler, standard, 374.
 Conventions, places of, 2.
 Coupler, automatic, standard, 373.
 Crone, S. A., address of, 32-34.
 Crossman, W. D., elected associate member, 44.

D.

Decisions of arbitration committee, 243-241 ; approved, 235, 236.
Demarest, G. W., elected treasurer, 236.
Dictionary of terms, 400.

DISCUSSION OF REPORTS OF COMMITTEE :

Care of journal boxes, 142-152.
Conference with auditors, 60.
Passenger car pedestal and journal box for journal $4\frac{1}{4}$ by 8 inches, 199-201.
Proposed modification of rules for loading long lumber, 213-215.
Rust from salt-water drippings, 87, 88.
Standards and recommended practice, 52-55.
Steel car framing, discussion on, 197, 198.
Triple valve tests, report of committee, 61-64.

DISCUSSION ON TOPICAL SUBJECTS :

Air-brake details for freight cars, 216-217.
Air-brake testing plant for large terminals, 72-74.
Axles, 218-222.
Drawbars, modification of present limits of height, 222-226.
Durability of paint applied by compressed air and by brush, topical discussion of, 230-233.
Limit gauges for allowable wear in M. C. B. couplers, 71-72.
Lumber specifications for freight cars, 64-70.
M. C. B. journal boxes, wedges, brasses and lids, 70-71.
Present limits of height, 222-226.
Proper maintenance of triple valves, 233.
Running boards and ladders, 226-230.
Side bearings, 216.
Standard trucks for 60,000, 80,000 and 100,000 lb. capacity cars, 74-80.
Distance between backs of flanges of car wheels, 375.
Door fixtures, recommended practice, 397.
Drawbars, height of, standard, 376.
Dues, annual, assessment of, 43.
" collected from members, details of, 38-42.

E.

Election of officers, 236.
Entertainments, 400.
Executive committee, minutes of meetings, 354, 356.

F.

Fletcher journal box lid for 80,000-lb. capacity cars, recommended practice, 398.
Friday's session, 132.
Frog wing gauge, 375.

G.

Galbraith, R. M., letter from, on light weight of cars, 89.
Gauge for determining wear of M. C. B. couplers—Thomas Fildes, 103.
Guarantee for cast-iron wheels, recommended practice, 381, 382.
Guard rail gauge, standard, 375.

H.

Handholds, recommended practice, 387.
Height of drawbars, standard, 376.
Hennessey, J. J., elected second vice-president, 236.

I.

International correspondence school, invitation of, 44.

J.

Journal bearing and wedge gauges, recommended practice, 390.
Journal box and details, for $3\frac{1}{4}$ by 7-inch journal, standard, 370.
Journal box and details, for $4\frac{1}{4}$ by 7-inch journal, standard, 370.
Journal box and details, for 5 by 9-inch journal, standard, 3 1.
Journal boxes, care of, report of committee on, 133-141.
Journal box, passenger car, recommended practice, 398.

K.

Knapp, A. P., address of, 25, 26.

L.

Ladders, recommended practice, 386.
" topical discussion on, 226-230.
Letter ballot, circular relating to, 357-367; result of, 368.
Light weight of cars, letter from R. M. Galbraith, 89; discussion on, 89-91; appointment of committee on, 91.
Limit gauges, automatic coupler, 374.
" for round iron, recommended practice, 382, 383.
Loading logs, poles and bark on cars, 391, 426-447.
Lumber specifications for freight cars, topical discussion, 64-70.

M.

Marking cars, recommended practice, 384.
Marking fast freight line cars, 389.
McConnell, J. H., address of, 31.
Members, list of, 7-17.
Members present, list of, 35, 36.
Minimum thickness for steel tires, recommended practice, 391.
Mosely, Edward A., letter of, 91, 92.
Mounting wheels, recommended practice, 392.

N.

Nominating committee, appointment of, 43; report of, 104, 105.
Nuts, standard, 376-379.

O.

Obituary, F. J. Ferry, 448.
Officers for 1898-9, list of, 3.

P.

Pamphlets, standard size of, 376.
Passenger car pedestal and journal box for journal $4\frac{1}{4}$ by 8 inches, report of committee on, 198, 199.
Painting, compressed air vs. brush, durability of, discussion of, 230-233.
Pedestal, passenger car, recommended practice, 398.
Pedestal, standard, 373.
Phillips, E. A., elected associate member, 44.
Platform safety chains, recommended practice, 388.

Pocket strap, M. C. B. coupler, 374.
 Position of brake shafts, 386.
 President's address, 32-34.
 Prices in M. C. B. rules, report of committee, 108-111.
 Protection of trainmen, recommended practice, 386.

R.

RECOMMENDED PRACTICE OF THE ASSOCIATION:

Adjusting height of drawbars, 392.
 Air brake and signal instructions, 386, 402-425.
 " repair card, 385.
 " tests, 393-397.
 Arch bars for 80,000-lb. capacity cars, 389.
 Attachment of couplers to cars, 389.
 Check chains, 383.
 Collection of salt-water drippings, 399.
 Column bolt for 80,000-lb. capacity cars, 389.
 Dictionary of terms, 400.
 Door fixtures, 397.
 Entertainments, 400.
 Fletcher journal-box lid for 80,000-lb. capacity cars, 398.
 General dimensions of cars with steel underframing, 397.
 Guarantee for cast-iron wheels, 381, 382.
 Handholds, 387.
 Journal bearing and wedge gauges, 390.
 Ladders, 386.
 Limit gauges for round iron, 382, 383.
 Loading logs, poles and bark on cars, 391, 426-447.
 Marking cars, 384.
 " fast freight line cars, 389.
 Minimum thickness for steel tires, 391.
 Mounting wheels, 392.
 Passenger car pedestal and journal box, 398.
 Platform safety chains, 388.
 Position of brake shafts, 386.
 Protection of trainmen, 386.
 Running boards, 386.
 Safety chains for freight cars, 391.
 Specifications for cast-iron wheels, 380, 381.
 Springs for freight cars, 398, 399.
 Stenciling cars, 393.
 Steps, 386.
 Storing of line cars on foreign roads, 400.
 Uncoupling arrangement for M. C. B. couplers, 390.
 Recommended practice, report of committee on, 45-52; discussion, 52-55.
 Reference gauge for mounting and inspecting wheels, standard, 375.
 Report of Arbitration Committee, 238-242.
 " secretary, 36-42.
 " treasurer, 42.
 Reports, M. C. B., standard size of, 376.

REPORTS OF COMMITTEE ON:
 Auditing, 132.
 Care of journal boxes, 133-141; discussion of, 142-152.
 Conference with auditors, 55-60; referred to Arbitration Committee, 60.
 Correspondence and resolutions, 235.
 Light weight of cars, 133.
 Passenger car pedestal and journal box for journal $4\frac{1}{2}$ by 8 inches, 198, 199; discussion on, 199-201.
 Revision of air brake and signal instructions, 189-192.
 Rust from salt-water drippings, 83-87; discussion on, 87, 88.

Specifications for air-brake hose, 154-174.
 Springs for freight car trucks, 175-181; discussion on, 181.
 Standards and recommended practice, 45-52; discussion of, 52-55.
 Steel car framing, 193-197.
 Square bolt heads and nuts; * standards for pipe fittings, 152-154.
 Subjects for 1899, 234.
 Thermal tests for car wheels, 182-188; discussion on, 188.
 Triple valve tests, 60, 61; discussion on, 61-64.
 Rhodes, G. W., remarks on trains parting, 93-96.
 Robertson, W. J., elected third vice-president, 236.
 Rules of interchange, freight, 322-349; passenger, 350-353.
 Running boards, recommended practice, 386.
 Running boards, topical discussion on, 226-230.
 Rules for loading long lumber, proposed modification of, 202-213; discussion on, 213-216.

S.

Safety chains, recommended practice, 391.
 Salt-water drippings, rust from, report of committee, 83-87; discussion on, 87, 88.
 Schroyer, C. A., elected president, 236.
 Screw threads, standard, 376-379.
 Secretary's report, 36-42.
 Side bearings, topical discussion on, 216.
 Specifications for air-brake hose, report of committee on, 154-174.
 Specifications for cast-iron wheels, 380, 381.
 Specifications, standard size of, 376.
 Square bolt heads and nuts, report of committee on, 152-154.
 Standards for pipe fittings, report of committee on, 152-154.

STANDARDS OF THE ASSOCIATION:

Air brakes, general arrangement and details, 372, 373.
 Axle, with journals $3\frac{1}{4}$ by 7 inches, 370.
 " " " $4\frac{1}{4}$ by 8 " 371.
 " " " 5 by 9 " 371.
 Bolt heads, 376-379.
 Brake beam, 372.
 " head, 372.
 " shoe, 372.
 Buffer blocks and location, 374.
 Catalogues, standard size of, 376.
 Check gauge, 375.
 Contour lines, automatic coupler, 374.
 Coupler, automatic, 373.
 Distance between backs of flanges of car wheels, 375.
 Gauge, frog wing, 375.
 " guard rail, 375.
 " reference, for mounting and inspecting wheels, 375.
 " wheel flange thickness, 376.
 Gauges, limit, automatic coupler, 374.
 Height of drawbars, 376.
 Journal box and details, $3\frac{1}{2}$ by 7 inch journal, 370.
 " " " " $4\frac{1}{2}$ by 8 inch journal, 370.
 " " " " 5 by 9 inch journal, 371.
 Nuts, 376-379.
 Pamphlets, standard size of, 376.
 Pedestal, 373.
 Pocket strap, M. C. B. couplers, 374.

Reports, M. C. B., 376.
 Safety chains for freight cars, recommended practice, 391.
 Screw threads, 376-379.
 Specifications for cast-iron wheels, recommended practice, 380, 381.
 Specifications, standard size of, 376.
 Springs for freight car trucks, 398, 399.
 Steel underframing, general dimensions for, recommended practice, 397.
 Stenciling cars, recommended practice, 393.
 Steps, recommended practice, 386.
 Storing of line cars on foreign roads, 400.
 Terms and gauging points for wheels and track, 374.
 Yoke, M. C. B. couplers, 374.
 Wheel circumference measure, 371.
 " flange, 371.
 " tread, 371.
 Standards, report of committee on, 45-52; discussion, 52-55.
 Standard wheel and track gauges, report of committee on, 81.
 Springs for freight car trucks, report of committee on, 175-181, discussion on, 181.
 Steel car framing, report of committee on, 193-197; discussion on, 197, 198.
 Street, C. F., proposed as associate member, 234.
 Subjects for 1898-9, 5, 6.
 " " 1899, report of committee on, 234.

T.

Terms and gauging points for wheels and track, 374.
 Tests of triple valves by standing committee, authorized, 64.
 Thermal tests for car wheels, report of committee, 182-188.
 Thursday's session, 89-134.

TOPICAL SUBJECTS:

Air-brake details for freight cars, 217, 218.

Air-brake testing plant for large terminals, 72-74.
 Axles, 218-222.
 Durability of paint applied by compressed air and by brush, 230-233.
 Limit gauges for safe allowable wear in M. C. B. couplers, 70, 71.
 Lumber specifications for freight cars, 64-70.
 M. C. B. journal boxes, brasses, wedges and lids, 70, 71.
 Modification of limits for height of drawbars, 222-226.
 Proper maintenance of triple valves, 233.
 Running boards and ladders, 226-230.
 Side bearings, 216.
 Standard trucks for 60,000, 80,000 and 100,000-lb. capacity cars, 74-80.
 Trains parting, remarks of G. W. Rhodes, 93-96.
 " " " " A. M. Waitt, 97-104.

Treasurer's report, 42.
 Triple valve tests, report of committee on, 60, 61; discussion on, 61-64.
 Triple valves, proper maintenance, topical discussion on, 233.

U.

Uncoupling arrangement for M. C. B. couplers, 390.

W.

Waitt, A. M., remarks on trains parting, 97-104.
 Wednesday's session, 1-58.
 Wheel circumference measure, 371.
 " flange, thickness gauges, 376.
 " tread and flange, standard, 371.

Y.

Yoke, M. C. B. coupler, standard, 374.

M. C. B.—13.

**Standard Journal Box and Contained Parts.
For Journal 5 by 9 inches.**

M. C. B.—14.
Standard Journal Box.
For Journal 5 by 9 inches.

M. C. B.—15.

**Standard Bearing, Wedge and Lid.
For Journal 5 by 9 inches.**

M. C. B.—A.
Recommended Practice
for
Protection of Trainmen.
Marking Fast Freight Line Cars.
Arch Bars and Column Bolt
for
80,000-lb. Capacity Cars.

M. C. B.—B.
Recommended Practice
for
Attaching Automatic Couplers to Cars.
Uncoupling Attachments.

M. C. B.—C.
Recommended Practice
for
Journal Bearing and Wedge Gauges.
Safety Chains for Freight Cars.
Minimum Thickness of Steel Tires.

M. C. B.—D.
**Recommended Practice **
for
Loading Lumber and Timber on Cars.
Racking Cars for Loading Bark.
Loading Structural Material on Cars.
Loading Large Logs, Pipe and Stone on Cars.

M. C. B.—E.
Recommended Practice
for
Gauge for Locating Wheels Equidistant from
Center of Axle.

M. C. B.—F.
Recommended Practice
for
Box Car Side and End Doors.

M. C. B.—G.
Recommended Practice
for
Journal Box and Contained Parts,
For Journal $4\frac{1}{4}$ by 8 inches for Passenger Cars.

M. C. B.—H.
Recommended Practice
for
Passenger Car Pedestal,
For Journal $4\frac{1}{4}$ by 8 inches.

M. C. B.—J.
Recommended Practice
for
Springs and Spring Caps for Freight Car Trucks.
Collection of Salt-Water Drippings.

